ENGINEERING PLACEMENT OFFICE



Thomas A. Edison and his associates Menlo Park 1879

A GENERAL ELECTRIC

SCRAPBOOK HISTORY

with COMMENTARY

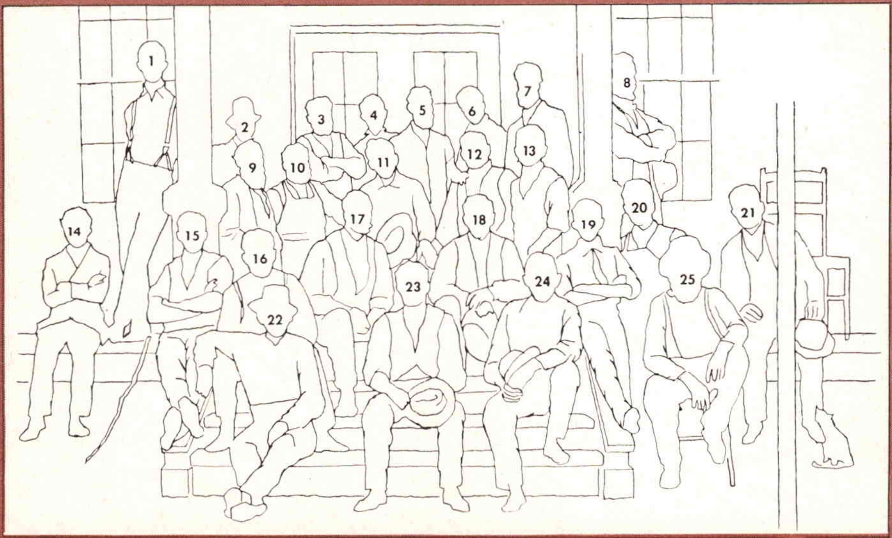
GE

1878 75 1953

YEARS OF ELECTRICAL PROGRESS

IDENTIFYING KEY TO COVER ILLUSTRATION:

1. "Basic" Lawson 2. Unknown 3. Unknown
4. Ludwig Boehm 5. Charles Batchelor
6. Francis Jehl 7. Francis R. Upton
8. "Doc" Haid 9. Unknown
10. David Cunningham 11. Thomas A. Edison
12. "Major" McLaughlin 13. Tom Logan
14. Johnny Randolph 15. Charles Flammer
16. George Dean 17. George Carman
18. John Ott 19. James Seymour
20. John Kelly 21. George Hill
22. Alfred Swanson 23. Martin Force
24. Stockton L. Griffin 25. Milo Andrus



A GENERAL ELECTRIC *Scrapbook* HISTORY

IT IS NOT BEYOND THE BOUNDS of plausibility that a late-nineteenth-century gentleman should have begun a scrapbook, recording what he liked to believe were the highlights of electrical progress. Or that his son — by now an elderly person — should continue this record and, with the aid of a new-fangled typewriter, compose a caption for each item and paste it carefully into place.

If a third-generation member of that family — also, by coincidence, a member of the General Electric Company family — had discovered the work of his elders, he might have set about constructing a book. Let us say that he did; that his own notes and pictures make up the right-hand pages of this booklet. And let us give him the advantage of perspective: a pair of eyes that can look into the past, the present — and even into the future.

This booklet, then, is a fantasy in spirit.

But in fact, it is an expression of General Electric's first seventy-five years of growth. It is a record of the growing pains and the modest triumphs of a company which pioneered the electrical industry.

This is not intended to be a comprehensive history of General Electric. Rather, it is intended to give the reader an appreciation of the vast growth in but one industry during the past three quarters of a century. Then, with this newly acquired appreciation, perhaps it will be his fortune to peer into the future and see an even greater degree of progress unfold during the next seventy-five years.



1879

NEW YORK HERALD, SUNDAY, DECEMBER 21, 1879.

EDISON'S LIGHT.

The Great Inventor's Triumph in Electric Illumination.

A SCRAP OF PAPER.

It Makes a Light, Without Gas or Flame, Cheaper Than Oil.

TRANSFORMED IN THE FURNACE.

Complete Details of the Perfected Carbon Lamp.

FIFTEEN MONTHS OF TOIL.

Story of His Tireless Experiments with Lamps, Burners and Generators.

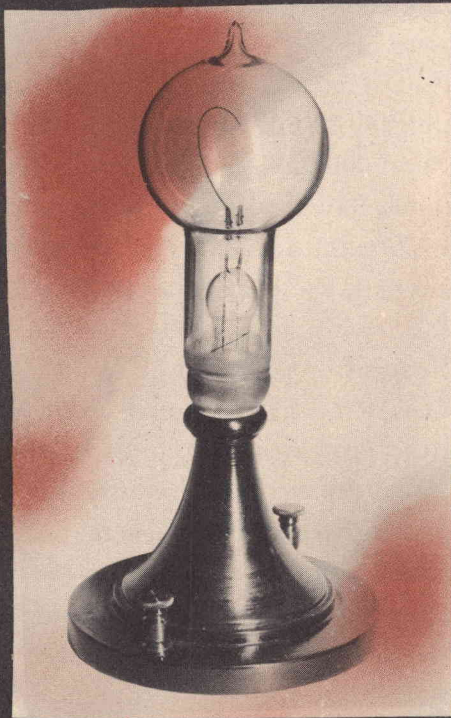
SUCCESS IN A COTTON THREAD.

The Wizard's Byplay, with Bodily Pain and Gold "Tailings."

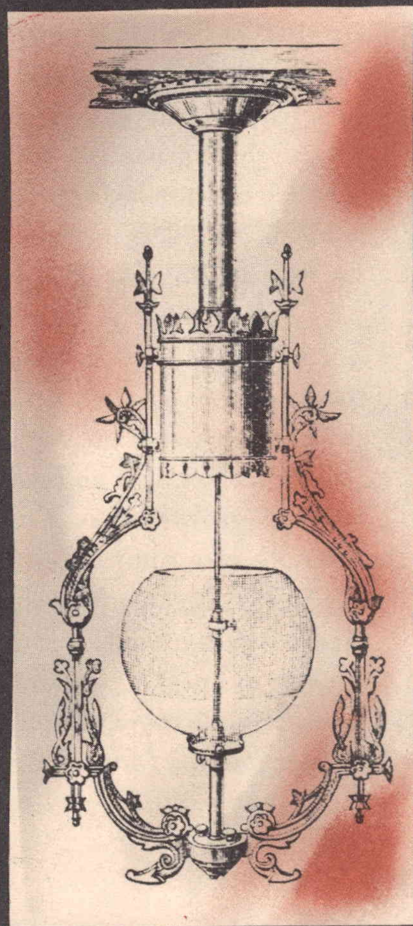
HISTORY OF ELECTRIC LIGHTING.

such closing making a new passage for the electric current and cutting it off from the incandescent platinum. When the latter contracted, as it did the moment the heat was lessened, the lever returned to its normal position and allowed the electric current to again pass through the platinum. By this device the inventor hoped to be able to keep the incandescent platinum always below its melting point. The contrivance is described in his first patent as follows:—

heated by the passage of the electric current through it. E is a thin piece of zircon that receives the heat rays thrown off by the reflector, C, which heat rays bring up the zircon, E, to vivid incandescence, making it give out a light much more brilliant than the light of the platinum spiral, C. With this form Mr. Edison tried numerous experiments, and from time to time made many alterations and improvements, but eventually the apparatus was placed in the category of non-successes.



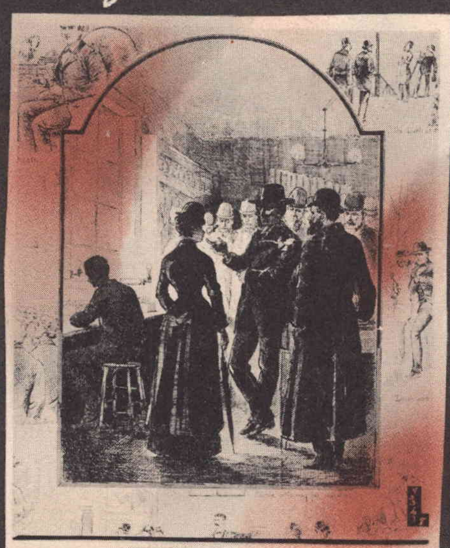
Mr. Edison's amazing light. What next!



For comparison, a Brush arc lamp.



Thos. A. Edison, Modern Wizard.



Edison, in laboratory, explains his light.



First photo by Edison's incandescent lights.



In this "glass house" adjoining Edison's laboratory was blown the 40-hour lamp bulb which made light history.

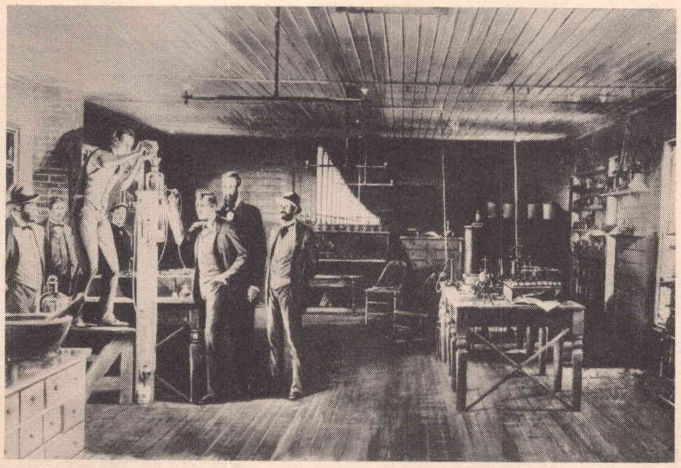
SEVENTY-FIVE years ago, in 1878, the Edison Electric Light Company was formed for the express purpose of developing a new source of light—the incandescent lamp. The event raised hardly a ripple in newspapers of the day. Such was the humble beginning of General Electric's parent company.

A year later Thomas Edison turned a glowing loop of carbonized thread from his wife's sewing basket into a miracle of light. As this first lamp burned through its fleeting hours of life on the laboratory table, Edison envisioned "great cities lighted from central stations," a vast system of machines and wires which would bring light to city streets, stores, and office buildings, and into the nation's homes.

His was no wild dream, for out of the demand for "Edison lights" grew a need for the dynamos and cables and conduits without which the system could not work.



Wires for lights in New York City were strung through tubes beneath the streets. From *Harpers Weekly*, 1882.



In his Menlo Park, New Jersey, laboratory, Edison waits tensely with his associates to see if this experiment, at last, will meet with success.



Edison's photographer, a Mr. Isaacs, took this early picture of Menlo Park. In front of building are poles on which lamp was first publicly shown.

1875—Edison purchases the ground at Menlo Park on which to build his famous laboratory.

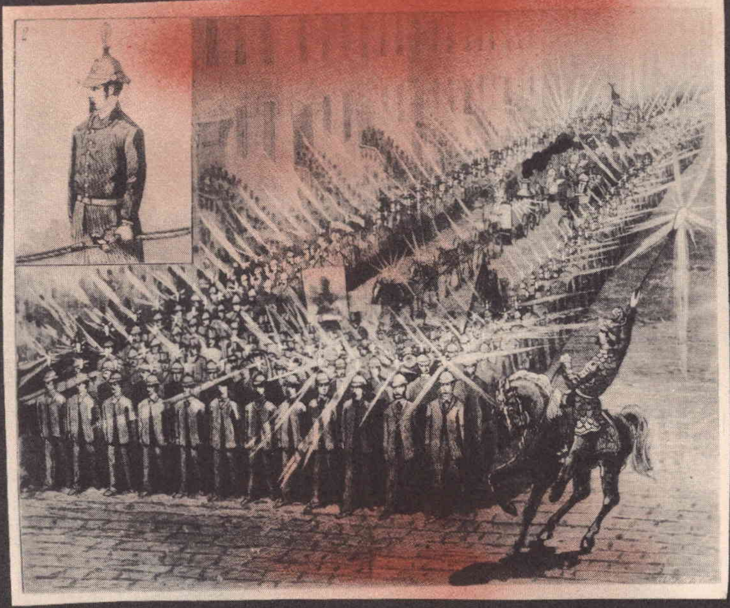
Elihu Thomson, assistant professor of Chemistry at the Boys Central High School, Philadelphia, operates the first radio set in history.

1876—Charles F. Brush constructs his first dynamo.

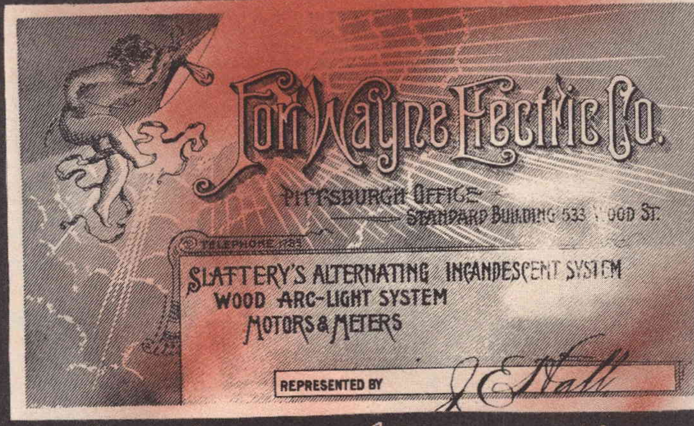
1877—The Cleveland Telegraph Supply Company undertakes the manufacture of Brush's dynamo and arc lamp.

Brush is granted patents on metal-coated carbons for arc lamps and the first open-coil arc dynamo.

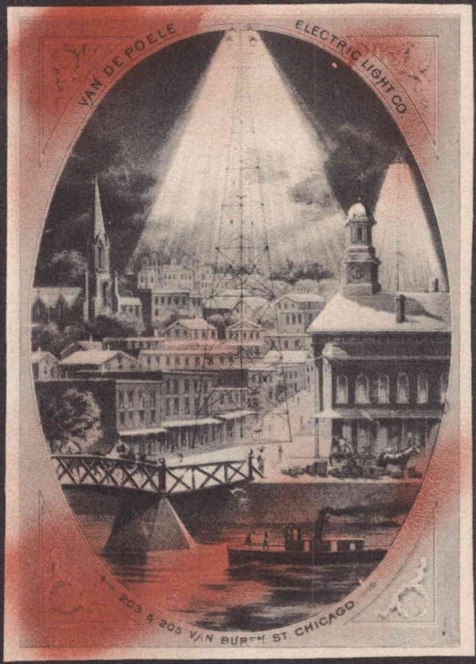
1878—This date marks the birth of the General Electric lineage: through the support of Grosvenor P. Lowrey and others, the Edison Electric Light Company is founded, supporting Edison's investigations into the question of developing an incandescent lamp.



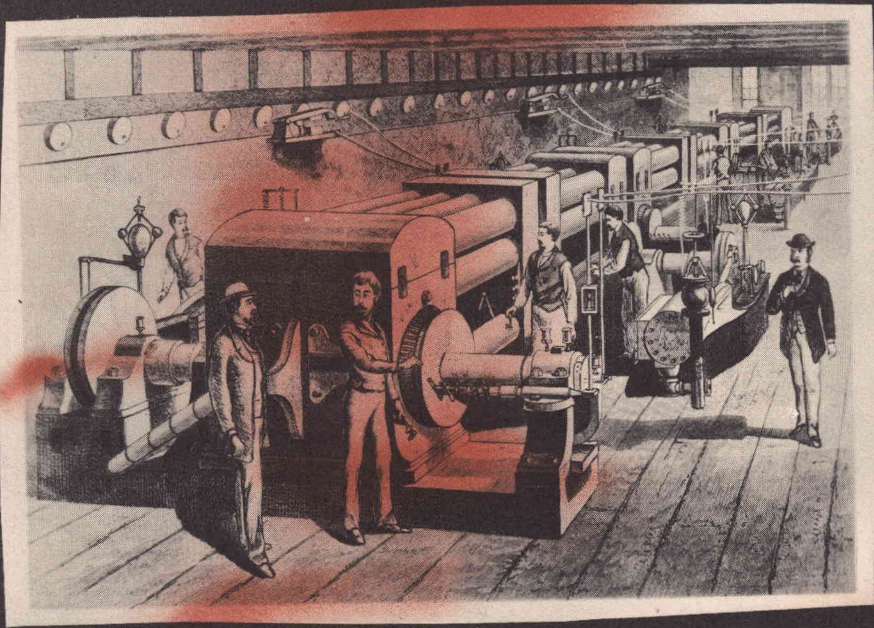
Never before an election campaign like this. Electric headlamps! New York



Behold our changing times! Electric men are everywhere.



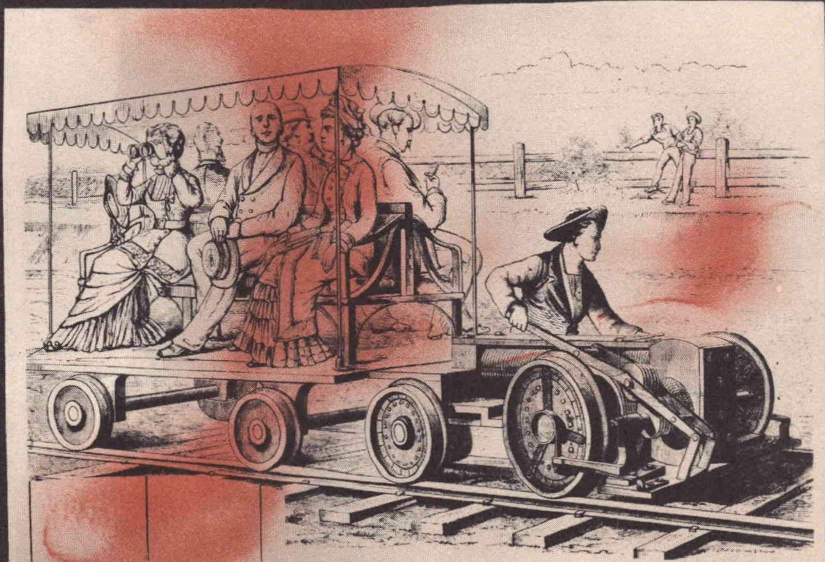
This is a new way to light a city.



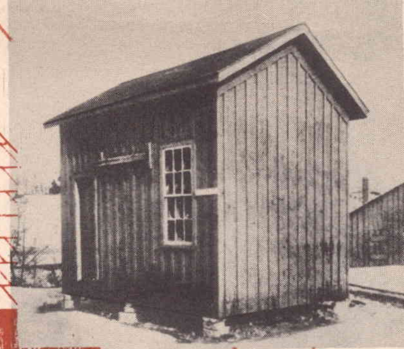
Mammoth dynamos, Edison's Pearl St. Station, N.Y. City—



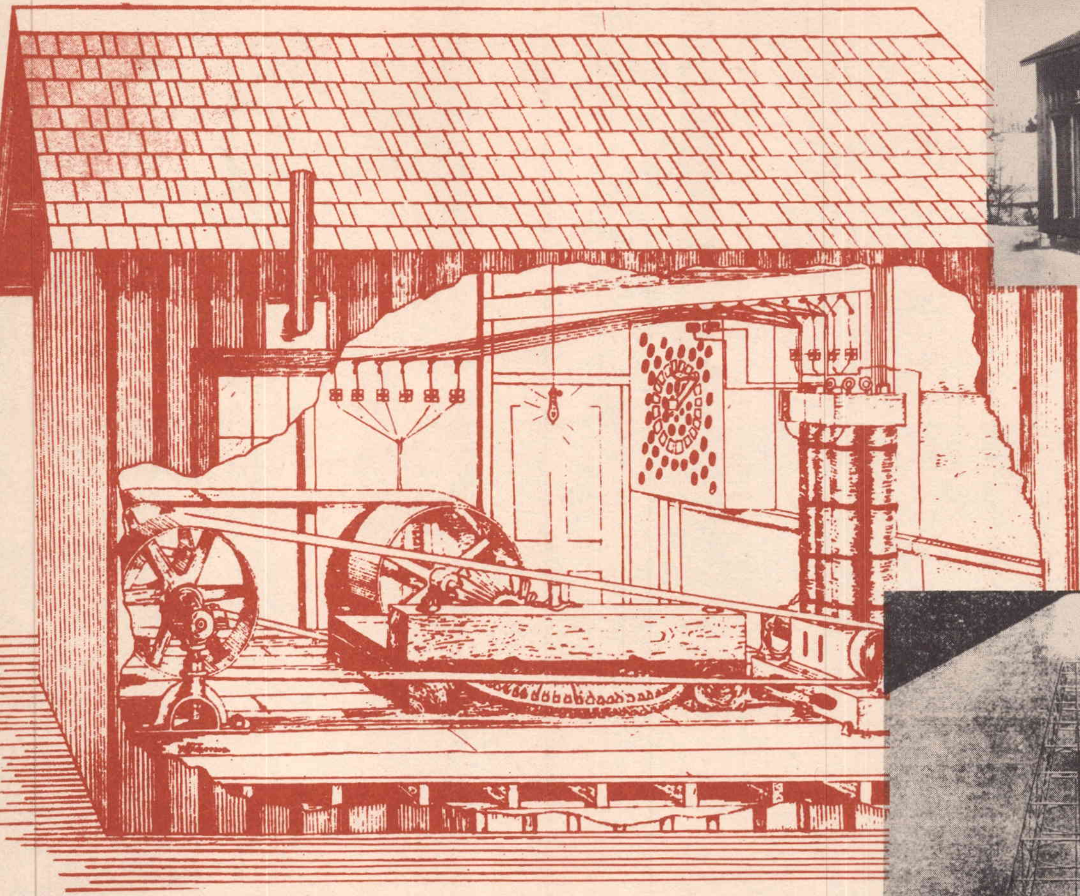
Marmaduke M. M. Slattery and battery-driven tricycle



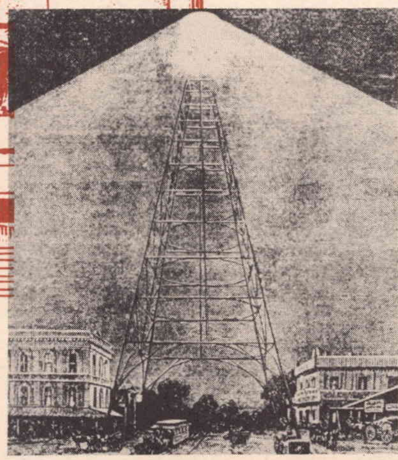
Electric Railway, Menlo Park, 1880.



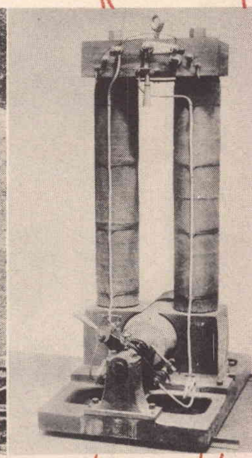
Exterior view, Appleton central station. In December, 1898, Edison's original machines were still in operation. Plant's capacity: 250 lamps.



Cutaway view of Edison's first central station, at Appleton, Wisconsin. It began operation two weeks before New York's Pearl Street station. 1882.



This arc light tower in San Jose, California, turned night into day back in 1885.



Edison's original dynamo was jokingly called "long-waisted Mary-Ann."

IN 1880, Elihu Thomson, young professor at the Boys Central High School in Philadelphia, gave up teaching to cast his lot with the infant electrical industry. For more than a half century he was actively identified with electrical development. That he was granted 700 patents testifies to the fact that he was a technical founder who built wisely. Of equal importance is the fact that he built an organization of men who wrote brilliant and creative chapters in the history of electricity.

When the American Electric Co. was formed, in its object was the commercial development of the patents of Professors Thomson and Edwin J. Houston. Associated with them was E. Wilbur Rice, Jr., who later became president of General Electric. Out of this enterprise, in 1883, grew the Thomson-Houston Electric Co. at Lynn, Mass.—in the formation and active management of which was a former shoe manufacturer, Charles A. Coffin.



Form U.

EDISON ELECTRIC ILLUMINATING COMPANY OF SHAMOKIN.

Shamokin, Pa., ... 188

M ....

Premises No. .... Street.

To THE EDISON ELECTRIC ILLUMINATING CO. OF SHAMOKIN, Dr.

For Electric Light Supplied from .... to ....

Standard Lamp hours at .... per M $

Street Lamp at .... per month $

Received Payment for the Company,

(A 10 Candle Lamp burning one hour, represents one standard lamp hour.)

This Bill may be paid to the Collector, or at the office of the Company

In the 1880's, too, the end of the month brought bills. A standard lamp hour was equivalent to a 10-candle lamp burning for an hour.

1879—Edison makes his first demonstration of a successful incandescent lamp and applies for a patent.

First large-scale installation of arc lighting is made in Monumental Park, Cleveland, using Brush lights on masts.

Niagara Falls is illuminated for first time, using a Brush dynamo and Brush arc lamps.

1880—Edison is granted basic patent on his lamp, and adopts bamboo filaments for his lamp.

The new SS *Columbia,* first to use electricity, is launched with an Edison system of lighting.

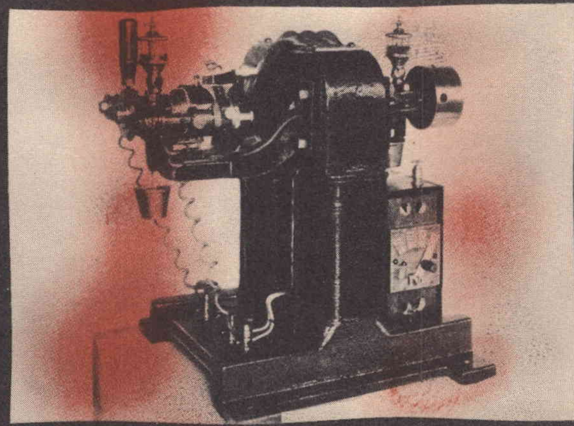
Edison's first electric railway is given several trial runs at Menlo Park.

Bergmann & Co. is formed, a G-E predecessor.

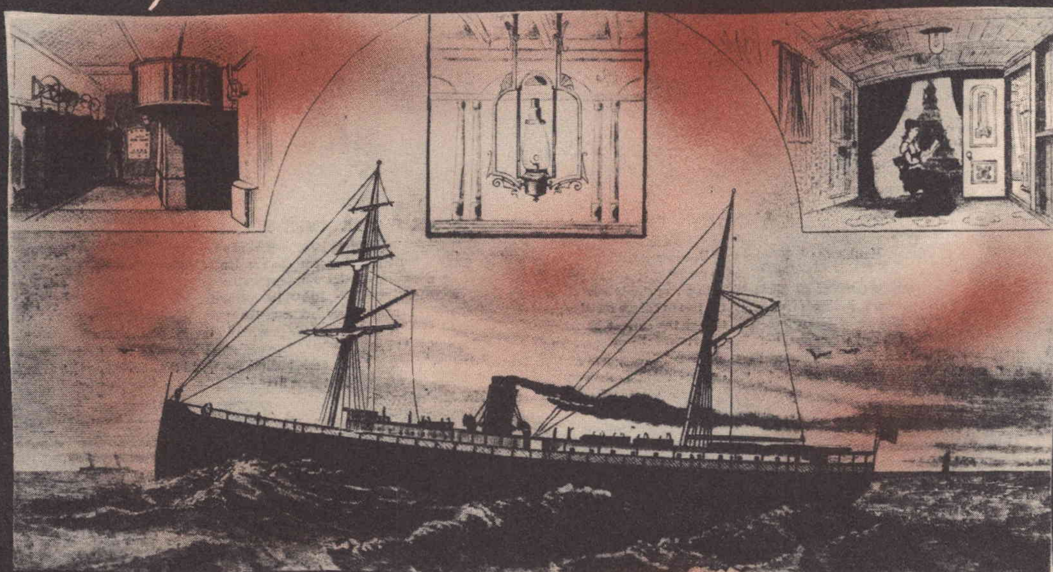
Brush Electric Co. of Cleveland is organized from the Telegraph Supply Co. First municipally owned electric light plant is put into service at Wabash, Ind., using Brush lamps, and an installation of these lamps is made in New York City.



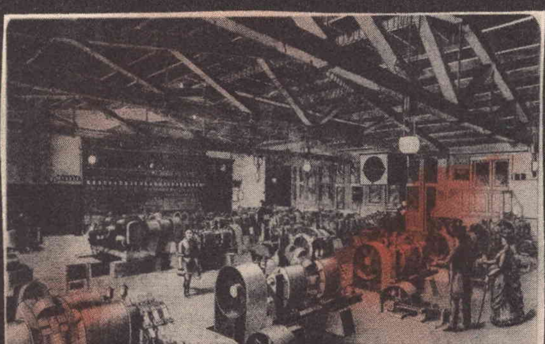
American business expands. Telegraph Supply is making arc lamps.



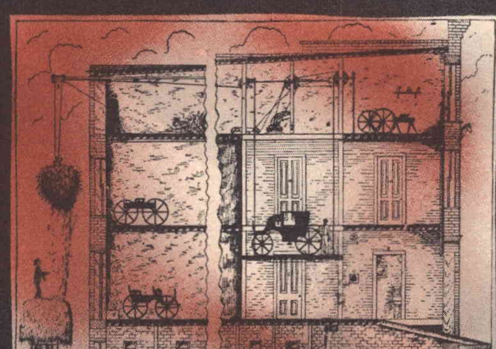
New Thomson motor has about 1 h.p.



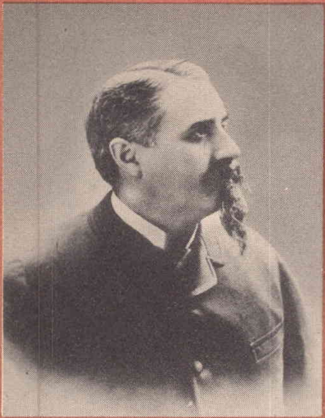
S. S. Columbia, on which electric lighting first went to sea. This is Edison system. 1880.



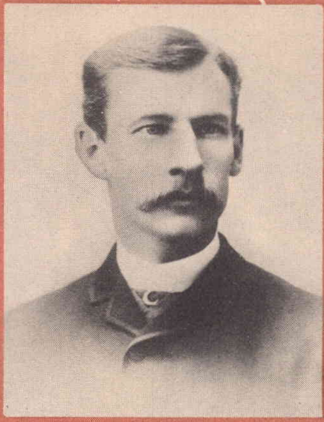
Brush Central Station, Philadelphia.



Motor-ized stable in Des Moines, Iowa



CHARLES F. BRUSH



FRANK J. SPRAGUE



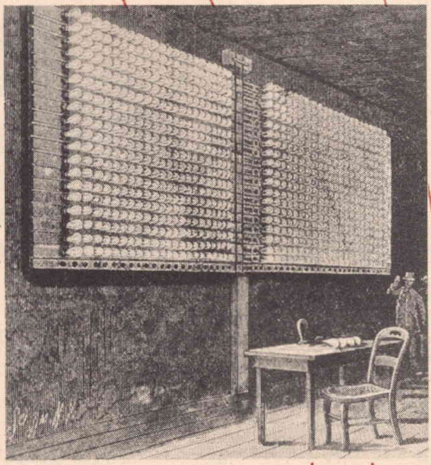
ELIHU THOMSON



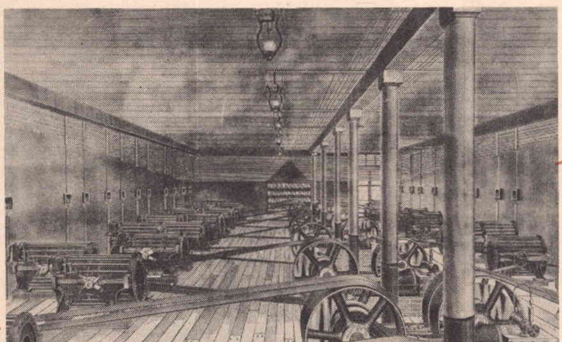
EDWIN J. HOUSTON

TYPICAL LIGHTING SYSTEMS IN 1884

LOCATION	DISTRIBUTING SYSTEM	CAPACITY IN 16 C-P LAMPS
New York City	Underground	13,000
Lawrence, Mass.	Underground	3,200
Brockton, Mass.	Underground	3,200
Fall River, Mass.	Underground	1,600
Shamokin, Pa.	Overhead	1,600
Sunbury, Pa.	Overhead	500
Hazleton, Pa.	Overhead	1,000
Williamsport, Pa.	Overhead	1,600
Newburgh, N. Y.	Underground	1,600
Bellefonte, Pa.	Overhead	800
Circleville, Ohio	Overhead	1,000
Cumberland, Md.	Overhead	1,000
Ashland, Pa.	Overhead	?
Tiffin, Ohio	Overhead	1,000
Middletown, Ohio	Overhead	1,000
Piqua, Ohio	Overhead	1,000
Mount Carmel, Pa.	Overhead	500
Appleton, Wis.	Overhead	500



A bank of 1000 lamps on the Pearl Street Station's top floor was used to bring generators up to full load before switching them over to outside power lines.



An interior view of the Thomson-Houston central station at Boston, Massachusetts, in 1884.



Flashlight photo taken in Thomson-Houston testing department. Test program student, left, went on to become President of Rose Polytechnic Institute. 1886 photo.

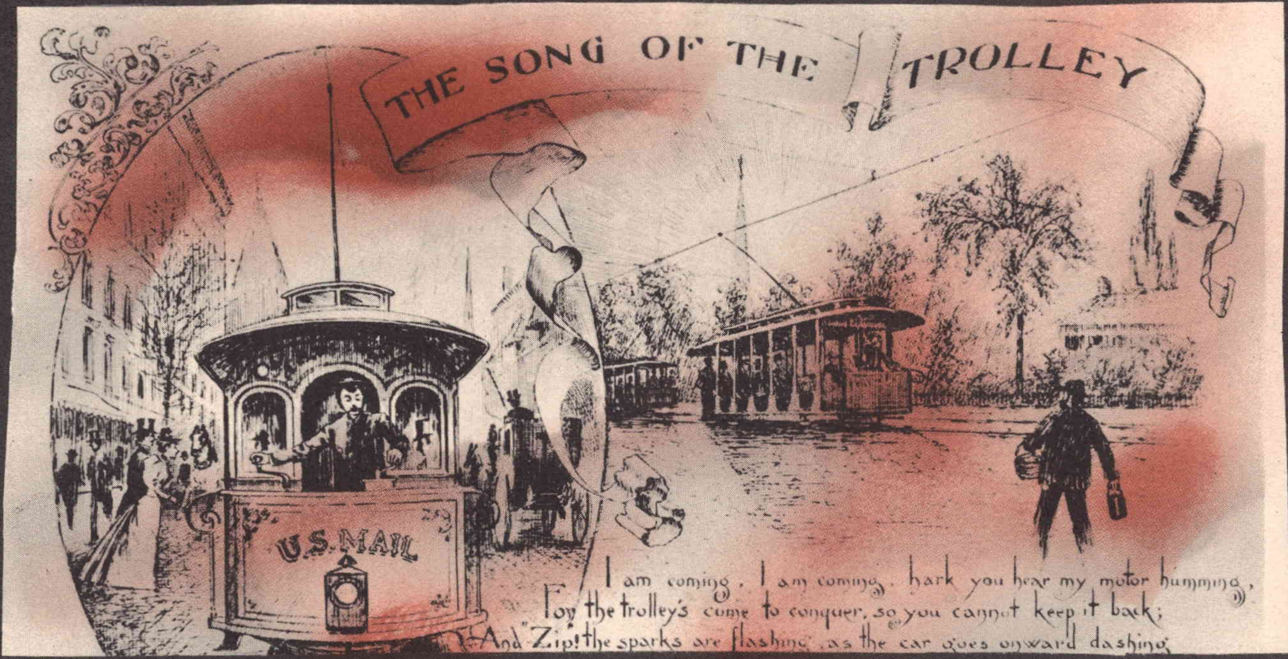
1881—Edison's first practical Jumbo dynamos. Establishment of Edison Machine Works, Edison Tube Co., Edison Shafting Co., and Fort Wayne Electric Light Co. Edison's patents: current regulator for dynamo-electric machines, high-vacuum apparatus, treatment of carbon for electric lamps, electric meter. Thomson develops constant-current regulator.

1882—Formation of Edison Company for Isolated Lighting. Transfer of lamp manufacture to Harrison, N. J. Pearl Street (NYC) Station begins operation. Sprague develops underrunning street railway trolley.

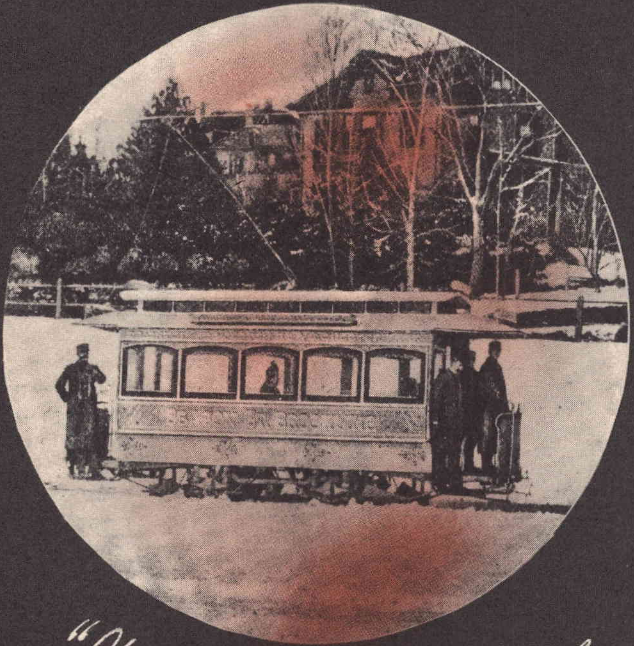
1883—Edison's 3-wire system has first central station application at Sunbury, Pa. and first underground 3-wire system at Brockton, Mass.

The Thomson-Houston Co. is formed, reorganizing the American Electric Co. Bentley-Knight Electric Railway Co. (G-E predecessor) is formed.

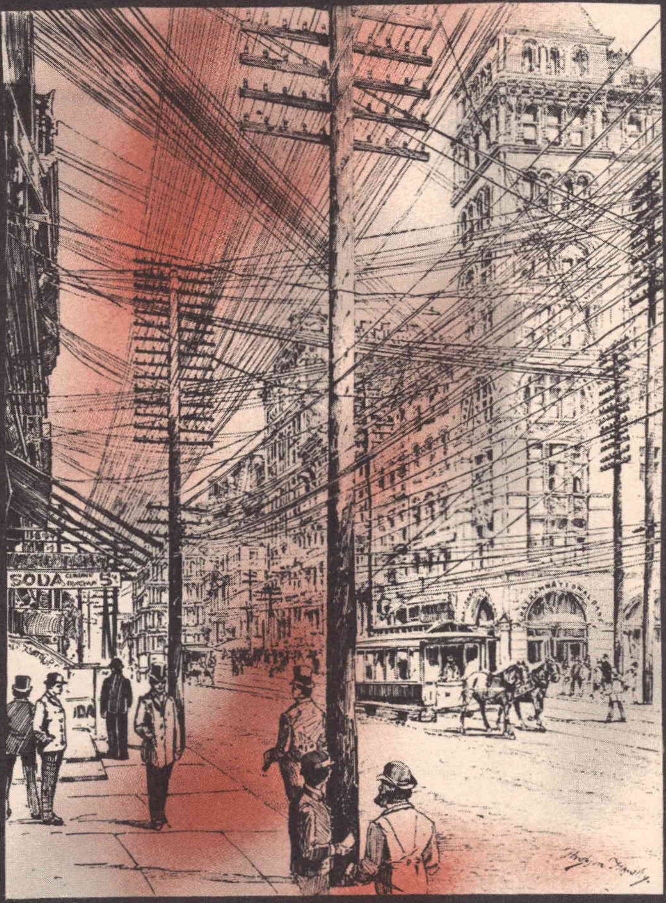
1884—Edison Effect first noted: forerunner of radio tube. Bentley-Knight runs first electric railway in Cleveland. Sprague exhibits an early d-c motor and forms the Sprague Electric Railway and Motor Co.



Yes, the trolley's come and conquered, so look out! and clear the track!



Boston—"I've no palace car or sleeper, but I carry people cheaper."

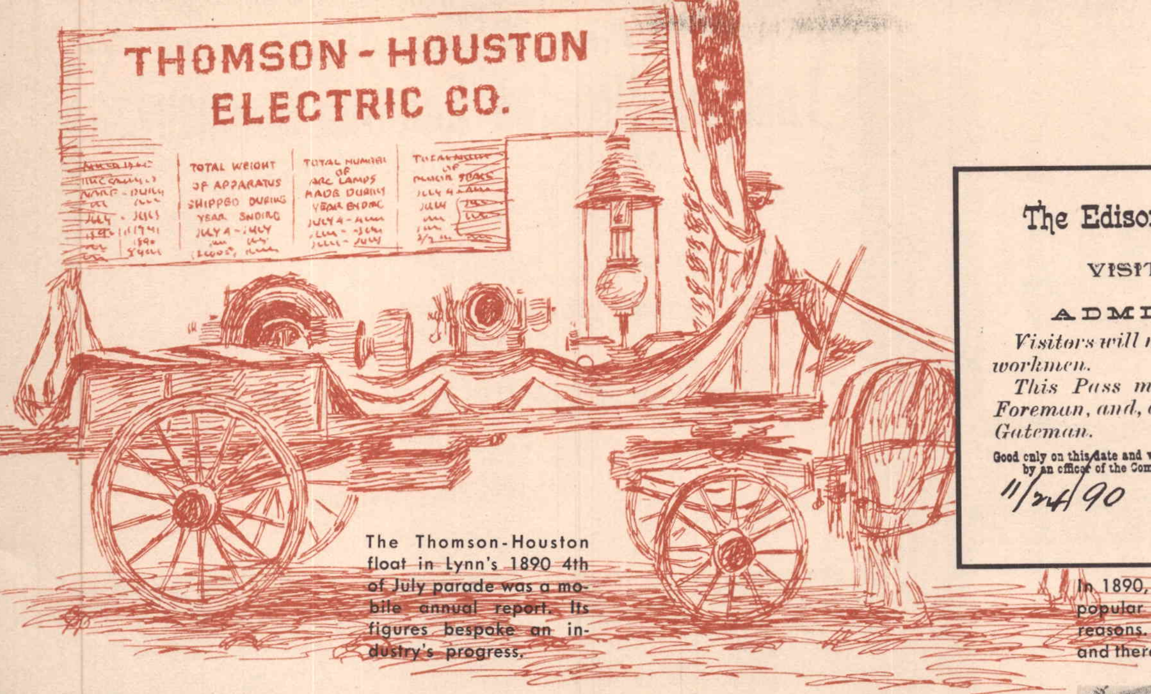


On lower Broadway, wires, wires, wires. The Electric age!

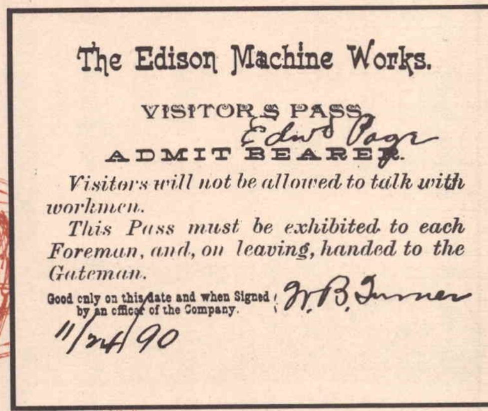


Poles go up everywhere.

1885–1888



The Thomson-Houston float in Lynn's 1890 4th of July parade was a mobile annual report. Its figures bespoke an industry's progress.



The Edison Machine Works.

VISITOR'S PASS. Edw'd Page

ADMIT BEARER.

Visitors will not be allowed to talk with workmen.

This Pass must be exhibited to each Foreman, and, on leaving, handed to the Gateman.

Good only on this date and when Signed by an officer of the Company. W. B. Turner

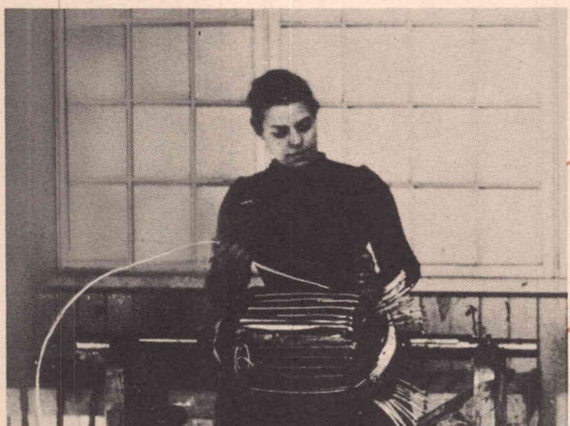
11/24/90

In 1890, as now, a visitor's pass was an unpopular necessity, though not for security reasons. Folks were just plain curious, then, and there wasn't room enough for all of them.

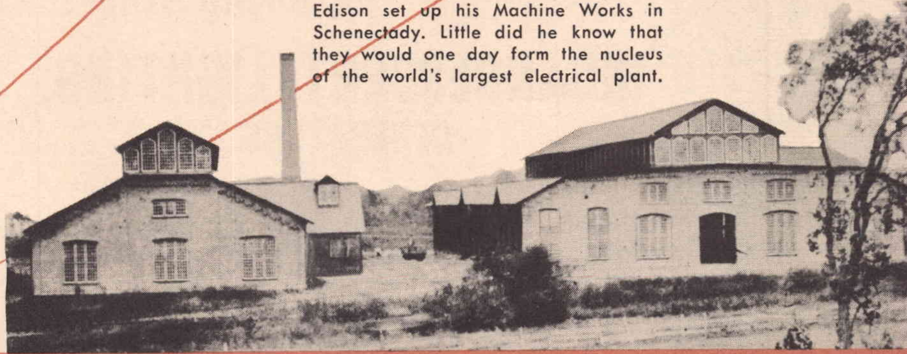
1891 STATEMENTS OF CONDITION	EDISON GENERAL ELECTRIC	THOMSON-HOUSTON
Capitalization	$15,000,000	$10,400,000
Gross Business	10,940,000	10,304,500
Profits	2,098,000	2,700,000
Number of Employees	6,000	4,000
Factory space, sq. ft.	400,000	340,000
Customers	324,000	324,000
Central Stations	375	870
Isolated Installations	2,300	very few
Street railways equipped	180	204
Street railway cars	2,230	2,760



Signs of the times in Richmond—passengers pile out to put their cantankerous Sprague trolley back on the tracks.



An Edison General Electric girl at Schenectady winds a bulky street car armature. Picture dates about 1891.



It was in these two modest shops that Edison set up his Machine Works in Schenectady. Little did he know that they would one day form the nucleus of the world's largest electrical plant.

1885—Thomson patents the grounded secondary and sets up an experimental a-c system. Van Depoele Electric Light Co. merges into the Van Depoele Electric Manufacturing Co. Fort Wayne Electric Light Co. floodlights the Statue of Liberty.

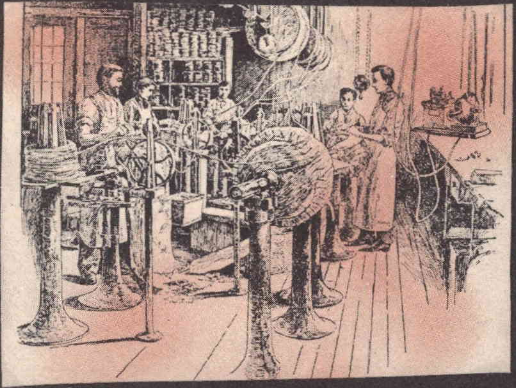
1886—Edison Machine Works moves to Schenectady; with it merges the Edison Tube Co. and the Edison Shafting Co. Edison Electric Light Co. takes over business handled by Edison Co. for Isolated Lighting, and the Edison United Manufacturing Co. is formed.

Thomson receives patent on first electric welding. A practical demonstration of Stanley's transformer proves a-c distribution practical.

1887—Thomson builds first repulsion-induction motor, and first Thomson alternator is shipped to Lynn Electric Light Co. (a G-E predecessor). Thomson receives patent on use of oil to insulate and cool transformers.

Schuyler Electric Manufacturing Co. becomes Schuyler Electric Co.

Bentley-Knight Electric Railway Co. lays the tracks for an electric railway on Fulton Street, New York City.



Motor winding at T-H

Thomson-Houston Electric Company.

ARC AND INCANDESCENT LIGHTING,

ALTERNATING AND DIRECT. HIGH AND LOW TENSION.

RECORDING WATT METER. THE ONLY ABSOLUTELY RELIABLE METER.

CLASS F TRANSFORMERS. ENSURING PERFECT SAFETY. [illegible] INSULATION.

SERIES PARALLEL CONTROLLER FOR STREET RAILWAYS.

Thomson-Houston Motor Companv.

THE THOMSON-HOUSTON MOTOR

IS THE ONLY STATIONARY MOTOR GIVING PERFECT RESULTS.

It possess Every Quality Essential to a Good Motor, and its Universal Adoption is a Guaranty of its Excellence.

THOMSON-VANDEPOELE ELECTRIC MINING CO.

ELECTRIC PUMPS. ELECTRIC VENTILATORS.
ELECTRIC HOISTS. ELECTRIC DRILLS. ELECTRIC COAL CUTTERS.
ELECTRIC MINE LOCOMOTIVES.

Branch Offices:

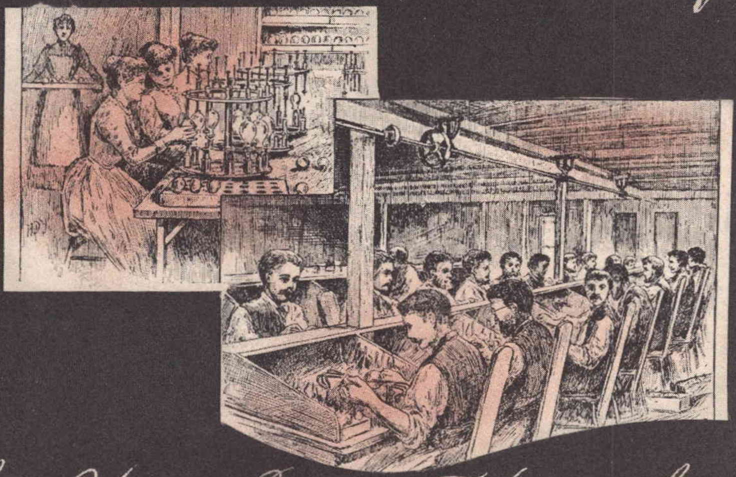
620 Atlantic Avenue, Boston, Mass.
173-175 Adams Street, Chicago, Ill.
Gould Building, Atlanta, Ga.
264 West Fourth Street, Cincinnati, O.
15 First Street, San Fra[illegible] Cal.
44 Broad Street, New York.
509 Arch Street, Philadelphia, Pa.
Masonic Temple, Denver, Col.
401-407 Sibley Str., St. Paul, Minn.

Write for Our New Catalogue.

Ad in July 27, 1892, "Electricity."



Searchlight test, Mt. Wash.



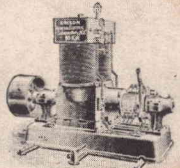
West Lynn T-H employees, 1891

EDISON GENERAL ELECTRIC COMPANY.

44 BROAD STREET. New York.

INCANDESCENT LIGHTING.

THE ONLY SATISFACTORY SYSTEM, GIVING GREATEST RESULT FOR LEAST OUTLAY.



GENERATORS. HIGHEST EFFICIENCY. ELECTRICALLY AND MECHANICALLY SUPERIOR TO ALL OTHERS.

COMPACT. DURABLE. PERFECT.

LAMPS. THE ONLY INCANDESCENT LAMPS WHICH HAVE SECURED UNIVERSAL APPROVAL.

MILLIONS SOLD AND MILLIONS; SELLING.



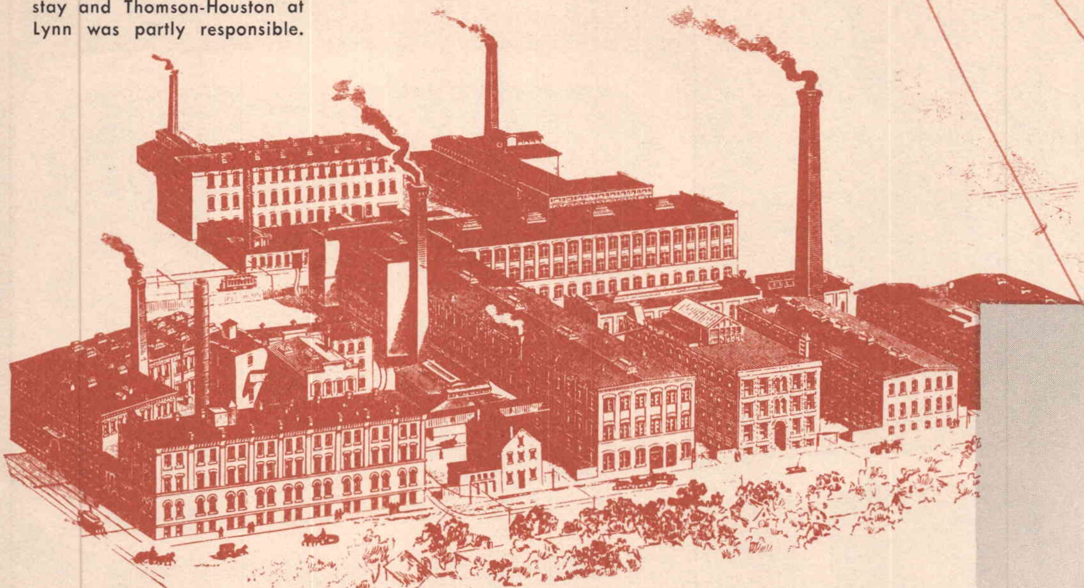
ELECTRICALLY ILLUMINATED SIGNS AND DECORATIVE DISPLAYS.

SAFETY DEVICES. MEASURING, INDICATING AND REGULATING INSTRUMENTS.

Electric Lighting Supplies.

Competition — in same magazine as above ad.

In 1892, electricity was here to stay and Thomson-Houston at Lynn was partly responsible.



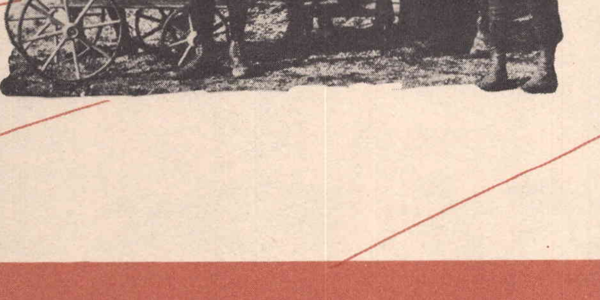


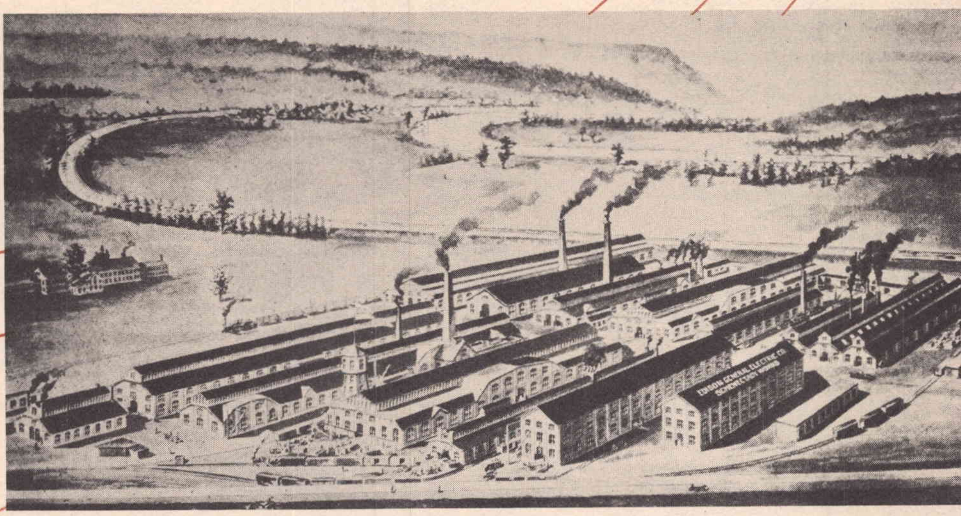
Charles A. Coffin, a Thomson-Houston executive, remained with the company until it became a part of General Electric, and he was its first president.

THE EARLY YEARS saw rapid progress in the development of electricity. Everywhere were the seething of new ideas, the triumph of new applications, the virile energy of a new industry.

The great need was for co-operation and unity of purpose—for a wise mind and a strong hand to command diffused and uncoordinated policies. This need was met in 1892 when the Edison General Electric and Thomson-Houston companies were merged to form the General Electric Company under the leadership of Charles A. Coffin.

Taking father's lunch to the Schenectady Works each noon was a small boy's chore.





The Schenectady Works of Edison General Electric had plenty of room to expand in 1891—and now, some six decades later, a sprawling plant employs nearly 41,000 people.

1889—Edison General Electric Co. formed: consolidation of Edison Electric Light and Edison Lamp Cos., Edison Machine Works and Bergmann & Co., and purchase of United Edison Manufacturing Co. and Sprague Electric Railway and Motor Co. Thomson-Houston Co. buys Brush Electric Co. Bentley-Knight Electric Railway Co. is merged with Thomson-Houston.

Steinmetz arrives in New York via steerage and begins work with Eickemeyer & Osterheld in Yonkers.

1890—United Edison Manufacturing Co., bought by Edison General Electric the previous year, has its operations taken over by that company.

Edison General Electric sets up a district sales organization.

Charles A. Coffin of Thomson-Houston organizes United Electric Securities Co. for financing purposes.

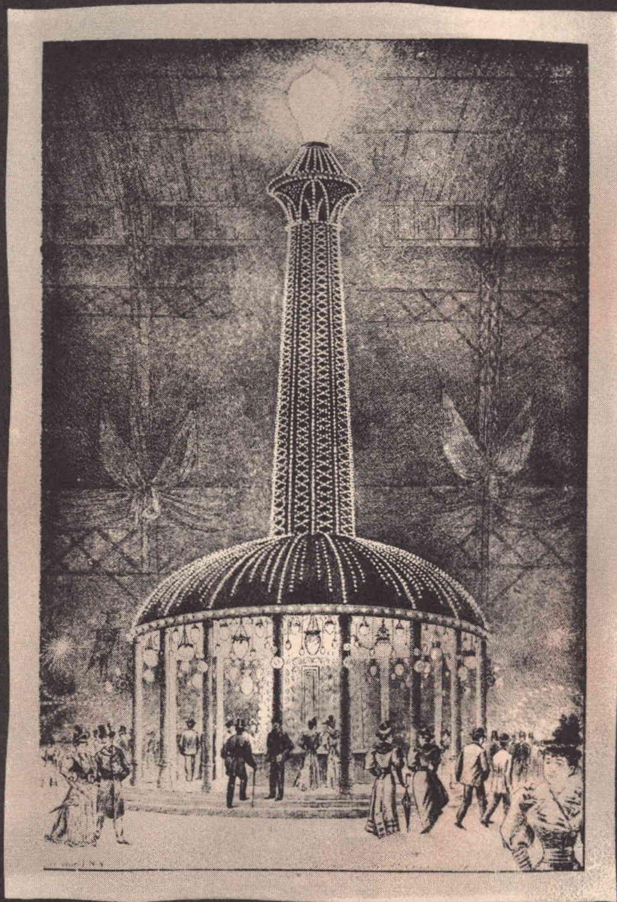
Stanley Electric Manufacturing Co. of Pittsfield is formed.

1891—Edison wins, through court victory, all patent rights on incandescent lamps. Pittsfield ships its first transformer.

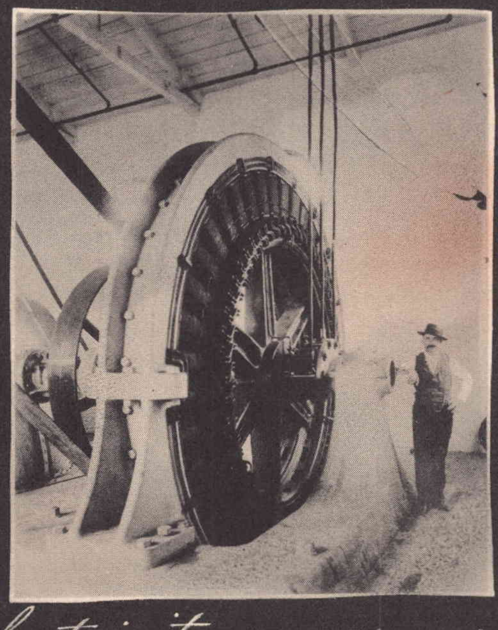
Edison & Thomson-Houston are pooling their gains. The resulting General Electric Co. should raise the electrical art to a height we have yet not dared dream of.



Testing Lab at Schenectady.



Chicago World's Fair—'93
A promise that the oil-lamp will soon disappear.



Electricity now runs Columbia Mills, S.C.

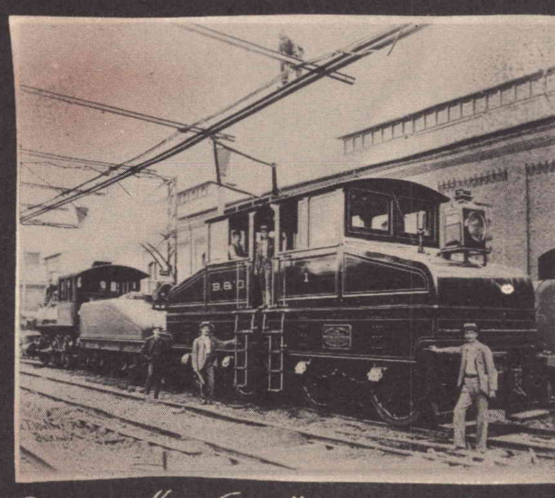


Electric * Motors
FOR ALL POWER PURPOSES.
MILLS, FACTORIES, SHOPS, LOCOMOTIVE WORKS, ETC., OPERATED BY OUR
ELECTRIC MOTORS.
Are Cleaner, Healthier, Give Greater Returns for Outlay, than those Operated by Other Methods.
PROFIT—ECONOMY.
GENERAL ELECTRIC COMPANY,
DISTRICT OFFICES:

44 Broad Street	New York.	620 Atlantic Avenue	Boston, Mass.
173 and 175 Adams Street	Chicago, Ill.	509 Arch Street	Philadelphia, Pa.
Fifth and Race Streets	Cincinnati, O.	401-407 Sibley Street	St. Paul, Minn.
Equitable Building	Atlanta, Ga.	1333 F Street, N. W.	Washington, D. C.
15 First Street	San Francisco, Cal.	Masonic Temple	Denver, Colo.

All business outside the U. S. transacted by Thomson-Houston International Electric Co. 44 Broad St. New York

General Electric advertises where to buy its products.



A new "Horse" for the run—Washington to New York.

EXTRACTS FROM PRESIDENT C. A. COFFIN'S MESSAGE TO STOCKHOLDERS IN 1st ANNUAL REPORT—APRIL 11, 1893

"The General Electric Company was incorporated April 15th, 1892, and began active business the first day of June, 1892...

"As you know, the General Electric Company acquired in exchange for its stock practically all the capital stock of the Edison General Electric Company, of the Thomson-Houston Electric Company and of the Thomson-Houston International Electric Company...

"The difficulties inherent in such a reorganization were many and serious, and we feel that the stockholders are to be congratulated that, largely because of the zeal and hearty co-operation of the former officers and employees of the Edison General and Thomson-Houston Companies, it has been carried through to a complete and successful issue...

"While your Company has about 6,000 customers included in the different departments of its business, the interesting and important development is in the direction of local lighting and railway enterprises."



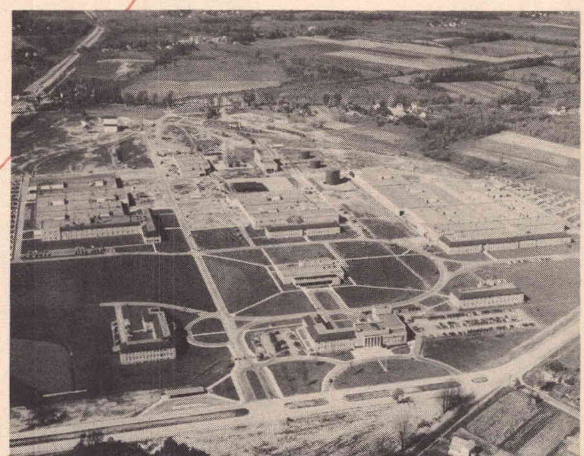
"19," a building with a long history. In 1897, when this photo was taken, it was the Schenectady Works Standardizing lab. Later, it became the first home of the General Engineering Laboratory.



In 1892, Charles Proteus Steinmetz came to work for G.E. at Lynn. In this 4′3″ engineer, the Company had acquired a veritable mental giant.



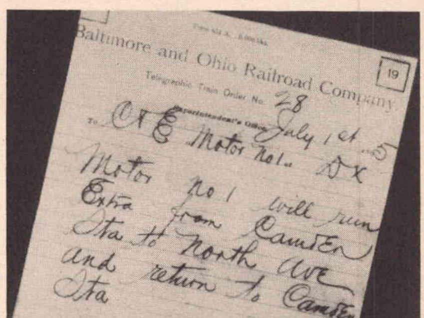
The great white Festival Hall of the Brazilian Centennial International Exposition in 1922, like the Chicago exhibit in 1893, was a triumph of G-E lighting engineers.



In contrast to G-E plants of yesteryear (top right; lower left) are such campus-like counterparts as Electronics Park, Syracuse.



No fork lifts, no trailer trucks here. Just mud and horse-drawn wagons. This was the growing Schenectady Works in 1902.



Baltimore and Ohio Railroad Company

Telegraphic Train Order No. 28

To C & E Motor No. 1 July 1st 95

Motor No 1 will run Extra from Camden Sta to North Ave and return to Camden Sta

The train order issued for the first run of G-E electric locomotive through Baltimore Tunnel of the B & O Railroad. 1895.

1892—The General Electric Company is formed through combination of the Edison General Electric Co. and the Thomson-Houston Co. G.E. buys Eickemeyer & Osterheld, and Steinmetz joins Lynn Works.

1893—General Electric, facing panic of 1893, issues first Annual Report. Transmission line work born with opening of Redlands-Mill Creek power line in California. Textile industry electrification entered by contracting to electrify Columbia Mills, Columbus, S. C. Van Depoele receives patents covering essential features of the trolley.

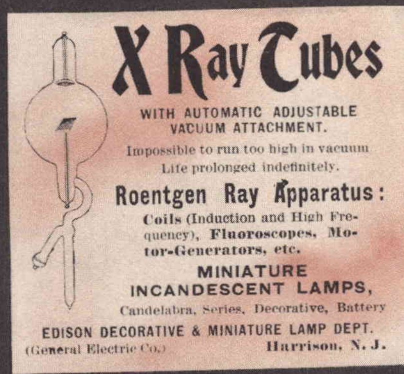
1894—Sales and engineering headquarters set up in Schenectady and Steinmetz transferred there from Lynn. Thomson patents first resistance furnace. G.E. receives contract for 26 miles of 10-kv transmission from Niagara to Buffalo. Brush Electric's manufacturing transfers to Lynn. Fort Wayne Electric Light Co. becomes Fort Wayne Electric Corp.

1895—G-E locomotive hauls first trains through B&O tunnel.

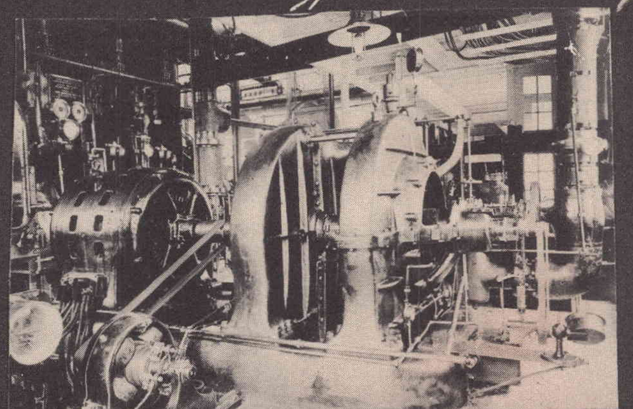
1896—Curtis starts developing turbine at Schenectady. Electrically controlled, G-E equipped gun turrets demonstrated on USS *Brooklyn*.



Dr. Steinmetz' research laboratory in Schenectady, gutted by fire.



One year after Roentgen's discovery.



Curtis test turbine—1900



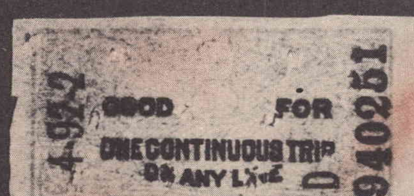
Workman and helper at Schenectady wind street car armature.



An electric fan—1900

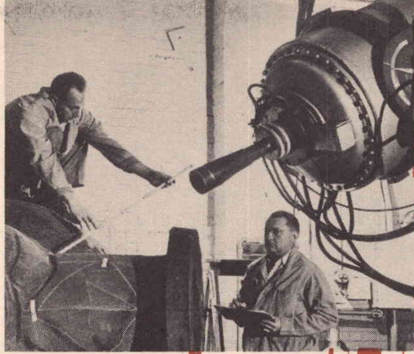


Electric motors like these may someday free man from killing toil.



First ticket sold by Manhattan Rwy. Co.

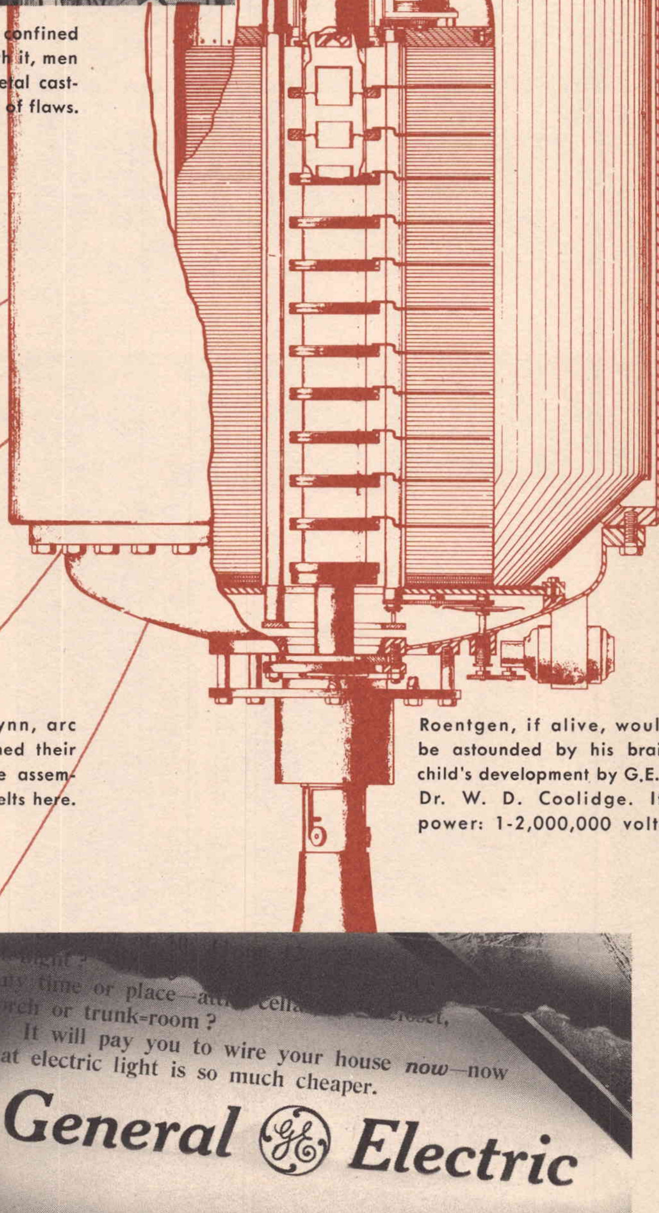
YEAR	NO. OF EMPLOYEES
1900	12,000
1910	32,000
1920	86,000
1930	78,380
1940	76,300
1950	183,800
1952	216,800



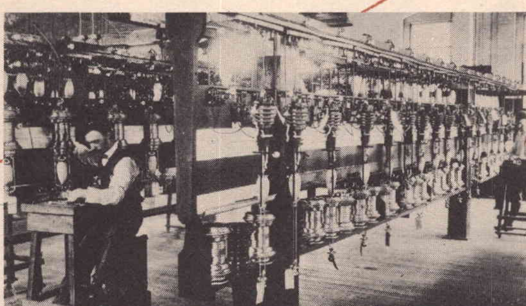
X-ray is no longer confined to medical uses. With it, men now probe great metal castings for the minutest of flaws.



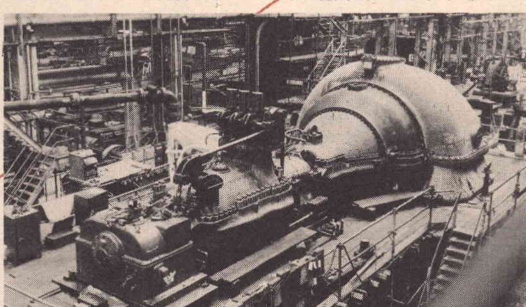
MIT professor, Dr. Willis R. Whitney, was the first head of G-E Research Laboratory, which was founded in 1900. Dr. Steinmetz' ill-fated barn was the Laboratory's birthplace.



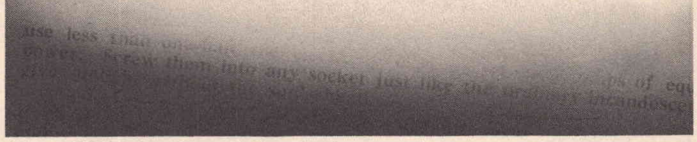
Roentgen, if alive, would be astounded by his brain child's development by G.E.'s Dr. W. D. Coolidge. Its power: 1-2,000,000 volts.



In 1898, at West Lynn, arc lamp assemblers pushed their work tables along the assembly line. No moving belts here.



This massive G-E steam turbine, on factory test, is 100 times as powerful as the 500-kw Curtis turbine shown on the opposite page.



About 1910, the General Electric signature began to make its appearance in Company advertising. This ad told why G-E lamps were "the sun's only rival."

1897—General Electric surplus moves into the black for the first time since the panic of 1893. Development started on the oil circuit breaker to control large quantities of power. Sprague operates first multiple-unit controls for railways in Chicago. G.E. undertakes an 81-mile, 33,000-volt transmission project, the longest commercial electric power transmission with the highest voltage yet attempted.

1898—Constant-current transformer developed by Elihu Thomson.

1899—General Electric buys the Fort Wayne Electric Corp. Sprague merges the Interior Conduit & Installation Co. with the Sprague Electric Elevator Co. to form the Sprague Electric Co.

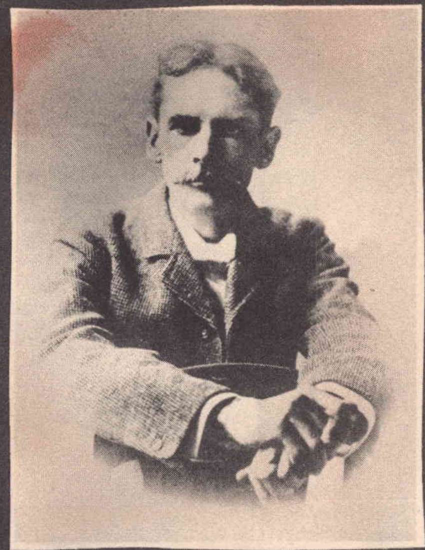
1900—General Electric Research Laboratory established under Dr. W. R. Whitney. Curtis, working with W. L. R. Emmet, designs first turbines.

Registration of G-E trade-mark (monogram) granted Sept. 18.

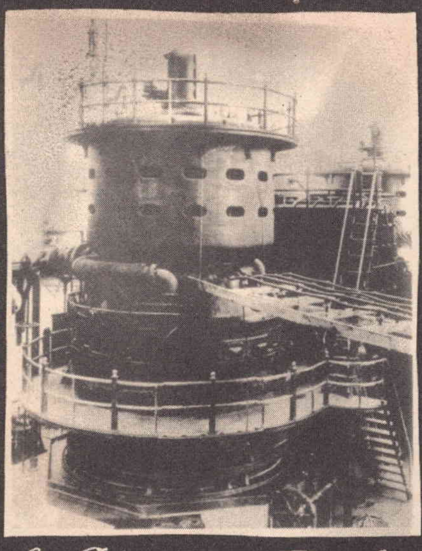
1901—National Electric Lamp Association is formed, later to become General Electric National Lamp Works. Dr. Whitney retained to head new Research Laboratory.



Here is Dr. Whitney and his Research Lab staff. Dr. Whitney is in the second row, third from right.



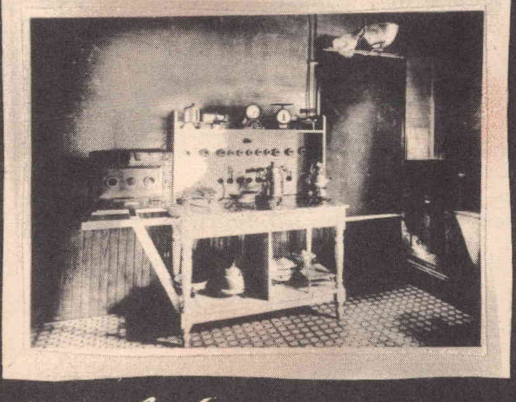
Wm. Stanley, Pittsfield Co. believes in a-c current.



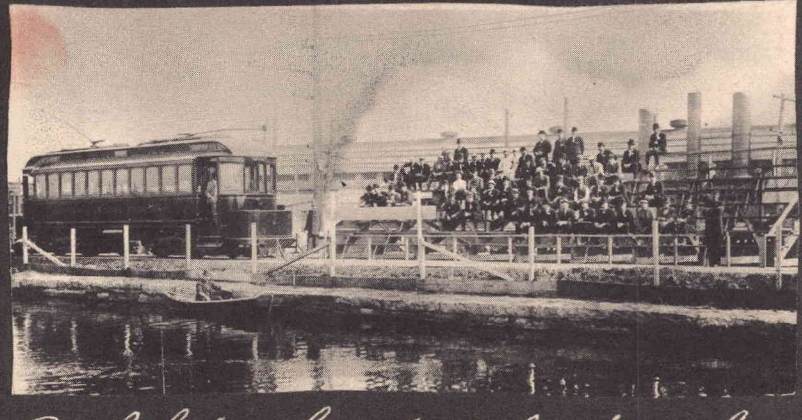
Will G.E.'s new Fiske St. turbine succeed?



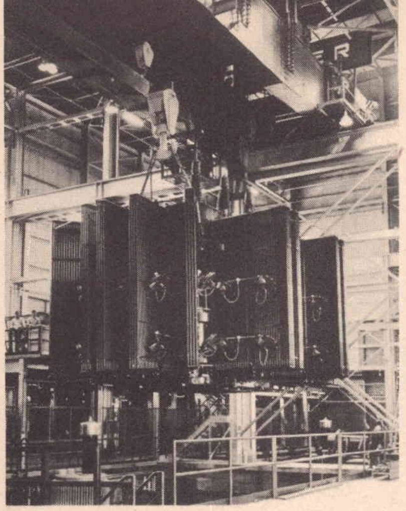
1903 is a bad business year—not helped by flood at Sch'dy Works.



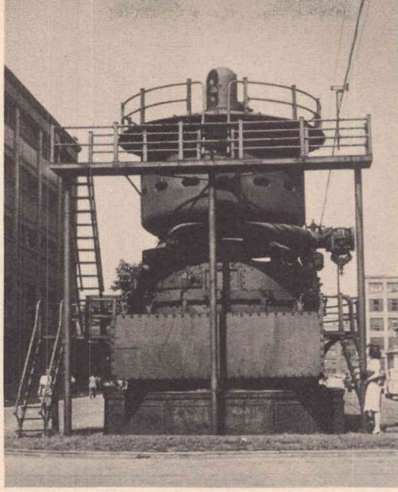
No hot cookstove—a 1905 electric kitchen.



At Sch'dy they test fenders by running head on into solid objects.



G.E.'s Pittsfield Works means transformers. From Stanley's 1500 workers 50-odd years ago, today this plant employs over 12,000 men and women.

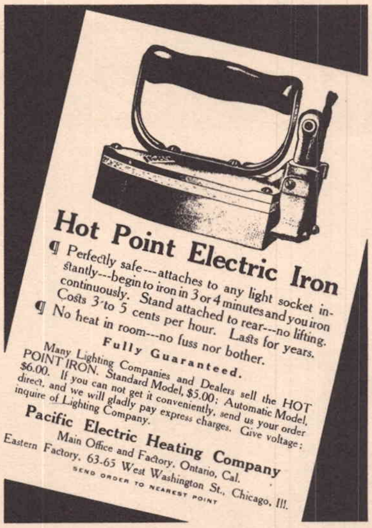


Fiske Street turbine now stands as a monument to courage in Schenectady's Works Avenue. Its successors are the muscle behind our electric power.



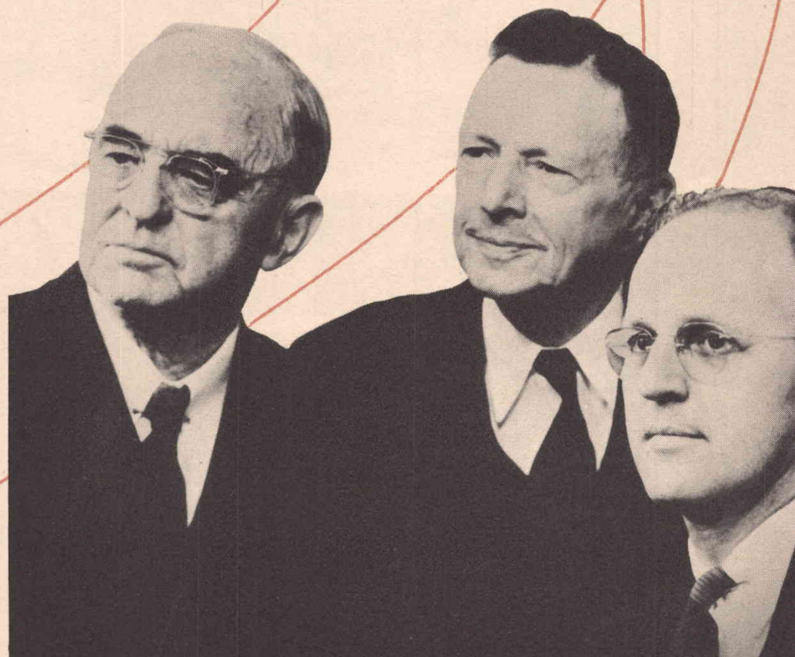


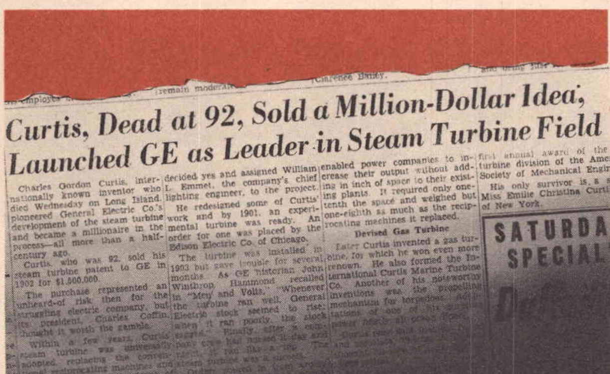
When Mrs. Adolph Strauch showed her 1906 version of our electric range to General Electric people at Appliance Park, Louisville, she was presented with a new one—1953 model.



"No fuss or bother," said Hotpoint in 1909 . . . a long way from irons heated on a cookstove.

Since its founding in 1900, the Research Laboratory has had three directors: Willis R. Whitney, 1900-1932; W. D. Coolidge, 1932-1945; and C. G. Suits, director of the Laboratory since 1945.





Curtis, Dead at 92, Sold a Million-Dollar Idea; Launched GE as Leader in Steam Turbine Field

Charles Gordon Curtis, internationally known inventor who died Wednesday on Long Island, pioneered General Electric Co.'s development of the steam turbine and became a millionaire in the process—all more than a half-century ago.

Curtis, who was 92, sold his steam turbine patent to GE in 1902 for $1,000,000.

The purchase represented an unheard-of risk then for the struggling electric company, but its president, Charles Coffin, thought it worth the gamble.

... decided yes and assigned William L. Emmet, the company's chief lighting engineer, to the project.

He redesigned some of Curtis' work and by 1901, an experimental turbine was ready. An order for one was placed by the Edison Electric Co. of Chicago.

... enabled power companies to increase their output without adding inch of space to their existing plants. It required only one-tenth the space and weighed but one-eighth as much as the reciprocating machines it replaced.

Devised Gas Turbine

Later Curtis invented a gas turbine, for which he won even more renown. He also formed the International Curtis Marine Turbine Co. ...

... turbine division of the American Society of Mechanical Engineers.

His only survivor is ... Miss Emilie Christina Curtis of New York.

SATURDAY SPECIAL

C. G. Curtis, whose steam turbine patent was sold to G.E. in 1902, died March 11, 1953.

1902—Illuminating Engineering Laboratory, with Walter D'Arcy Ryan as illuminating engineer, is transferred to Schenectady. Peter Cooper Hewitt develops a mercury-arc rectifier for conversion of alternating current to direct current. G.E. acquires Sprague Electric Co.

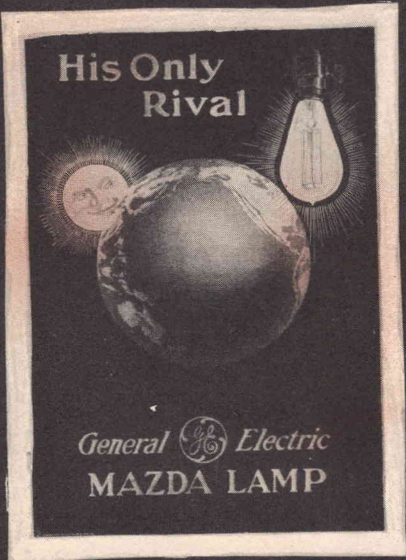
1903—G.E. acquires control of Stanley Electric Manufacturing Co., but latter continues as separate organization. Steinmetz demonstrates magnetic arc lamp. The steam turbine is successfully tested. Hewitt gives first practical demonstration of his mercury vapor arc lamp.

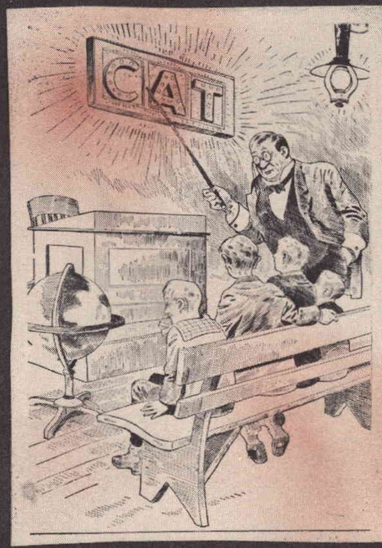
1904—Dr. Whitney develops a new-type electric resistance furnace. G.E. organizes Electrical Securities Corp. for financing purposes.

1905—G.E. organizes Electric Bond & Share Co. to aid small utilities. Whitney's "Gem" metalized-carbon filament lamp is introduced.

1906—G.E. introduces tantalum-filament lamp commercially. E. M. Hewlett conceives the original idea for suspension insulator. Suggestion system starts in earliest form. Vacation plan begun for factory workers.

1907–1911



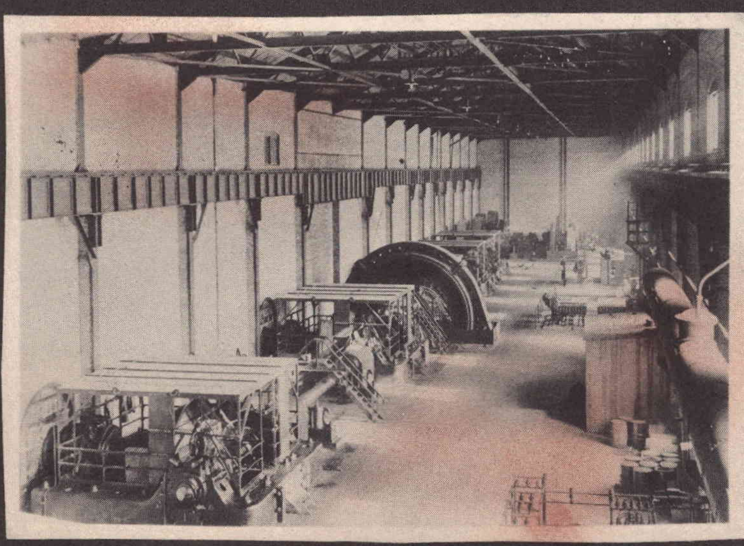


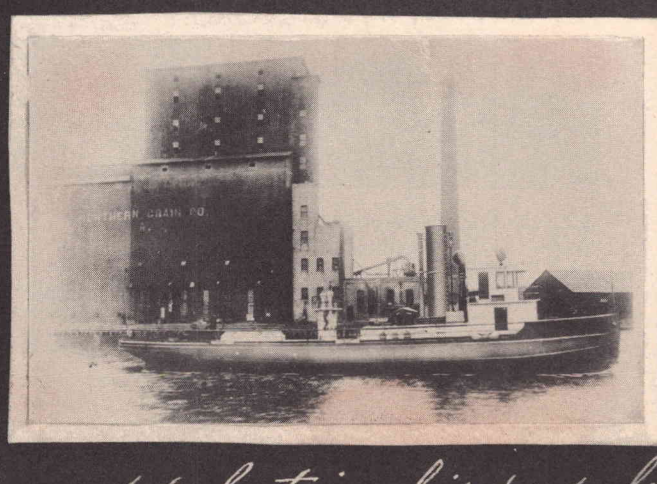


A 1910 ad. "School of the Future" A much better lamp!



"6000"—clean, fast service to and from Grand Central.





30'-tall motors make steel at Gary, Ind.

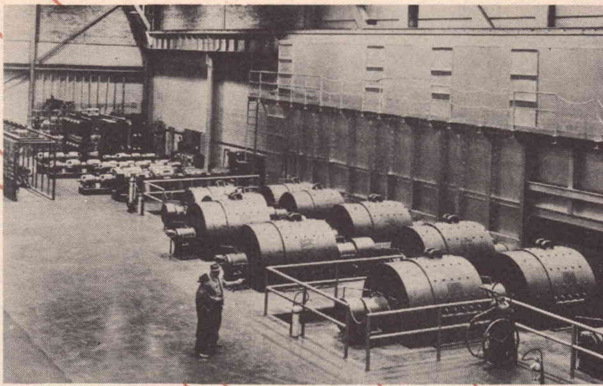
1st electric ship propulsion—1907—Chicago River fireboat

COOLIDGE AND DUCTILE TUNGSTEN

But in another year the ingots gradually yielded to Coolidge's extraordinary resourcefulness and persistence. By heating the ingots to 1650° C and taking small initial drafts, then gradually lowering the temperature as the fibrous structure began to develop until a final working temperature of 350° C was reached, he achieved complete success.

In order to draw the wire thus produced down to the diameters required for lamp filaments, very small diamond dies were required, and it became necessary for the laboratory to produce them. Coolidge procured the teaching services of an expert lapidary and then equipped and staffed a small die-making shop which was operated in the laboratory for several years as an auxiliary to the tungsten wire drawing department. Commercial production of ductile-tungsten wire of any desired size was an established fact. Lamps made with that wire were so much more sturdy and so much less expensive to make than other types that factory equipment, costing over a half million dollars, for making squirted filaments, was promptly scrapped, along with a half million dollars in squirted-filament lamps.

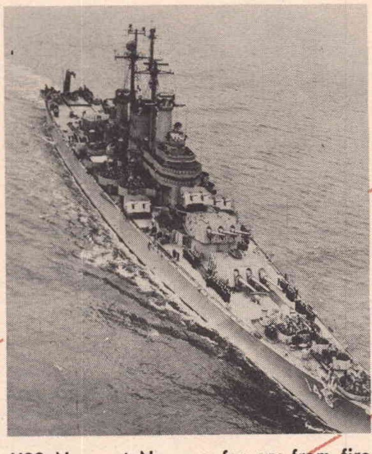
from ADVENTURE INTO THE UNKNOWN
by Laurence A. Hawkins



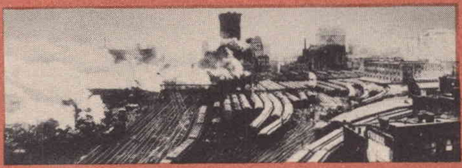
G-E steel mill drives such as these dwarf those of yesterday. These motors, installed at Jones & Laughlin in 1947, represent total of 16,850 h.p.



The school of the future, pictured on the opposite page, never materialized. What we have in this G-E lighted school is something better.



USS *Newport News*, a far cry from fireboats. During WW II, G.E. "built" 27,000,000 horsepower for naval propulsion.





Transformation in Manhattan, brought about by electrification of Grand Central Terminal. Taken from almost the same spot. Above, 1906; below 1953.

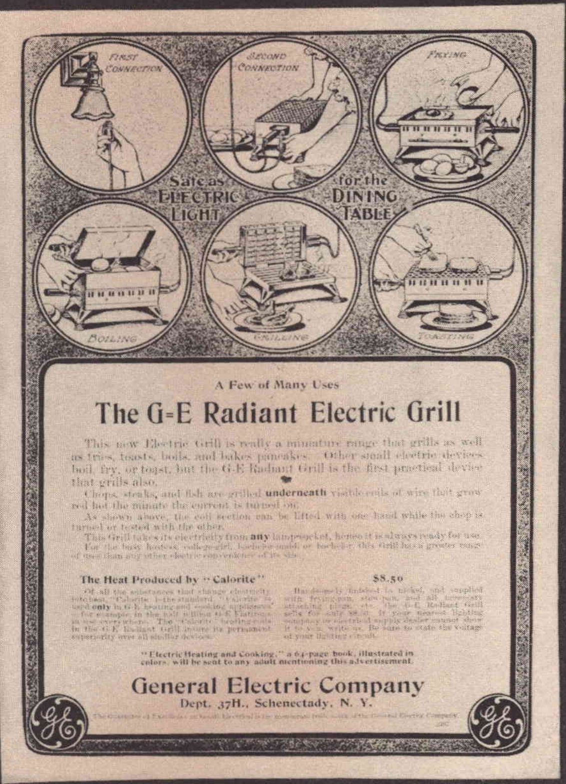
1907—Stanley Manufacturing Co. becomes the Pittsfield Works. Walter D'A Ryan illuminates Niagara Falls. The first boats electrically propelled are fireboats on the Chicago River, using G-E equipment.

1908—The first large G-E steel-mill motors are installed at the Gary Plant of the Indiana Steel Co. Dr. W. D. Coolidge renders tungsten ductile, thus laying groundwork for modern electric illumination.

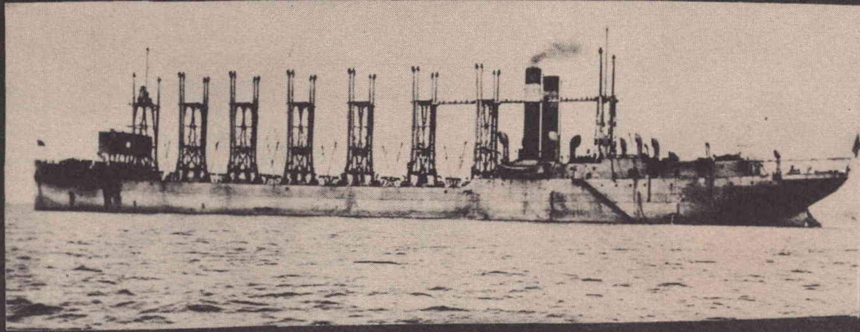
1909—Mazda is adopted as trade name for G-E lamps. More than 10 million Gem lamps are sold, outdistancing unmetalized-filament lamps.

1910—George A. Hughes, founder of Hotpoint, begins manufacture of the first practical electric range. G.E. announces plans to manufacture ductile-tungsten lamps.

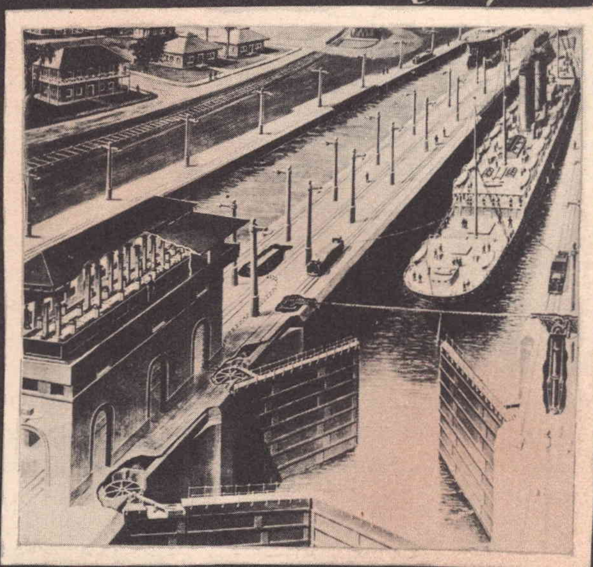
1911—G.E. commences the manufacture of tungsten lamps. The Pennsylvania General Electric Co. property becomes the Erie Works. The Fort Wayne Electric Corp. is integrated in the Company as the Fort Wayne Works. The Sprague Electric Co. operations are merged with G.E. to become the Sprague Works—later the Bloomfield Works.



A new convenience!



U.S.S. Jupiter—1st electric-drive Navy ship.



Panama Canal locks have G-E controls. Also G-E locomotives.



Research Lab conference—Langmuir at right; Whitney 3rd from left.



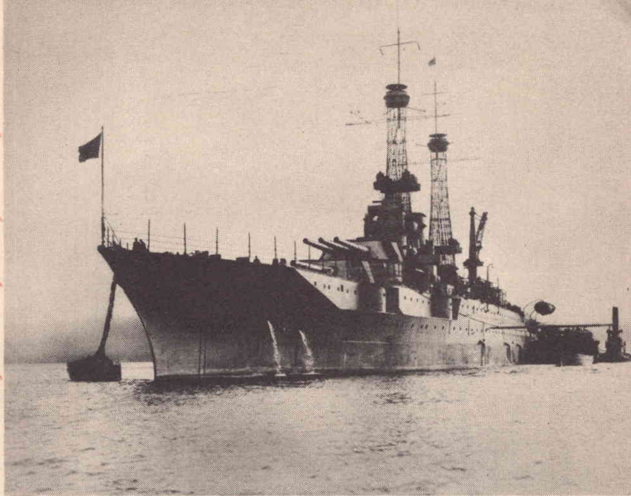
E.W. Rice, Jr. became President—1913.



More light at less cost!

GENERAL ELECTRIC PENSION PLAN (from 1952 ANNUAL REPORT)

Date of establishment 1912
Pensions paid during 41 years ending December 31, 1952 .... $100,111,000
Number on pension rolls December 31, 1952 14,036
Average age of pensioners .... 68.4 years
Average continuous service of pensioners .... 25.4 years
Minimum annual retirement income (including primary Federal Social Security payments) guaranteed to participants who retire at normal retirement age with 25 or more years of credited service $1,500



1915—USS *New Mexico* was Navy's first all-electric fighting ship. Turrets, propulsion, ship's galley—everything was electrified by G.E. The Navy was at first skeptical, then delighted.



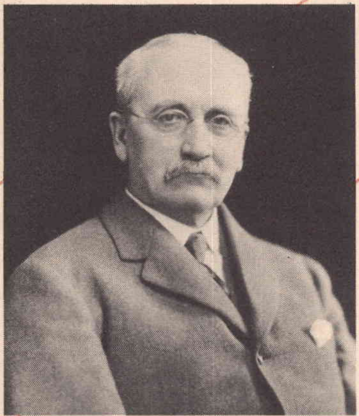
Dr. Irving Langmuir, pioneer of gas-filled lamps, with developmental pliotron tube used in 1914 for radio telephone communication.



The Institute of Light at Nela Park is testimony to the Company's constant efforts to improve old lamps, develop new ones, and, to offer the public more light at less cost.



September, 1923—Ladies of the Quarter Century Club enjoy an outing at Topsfield, Mass.



William L'R. Emmet, who convinced Navy of merits of electric ship propulsion. As engineer, he improved the turbine.



Quarter Century "Old Timers" seated about Elihu Thomson, a G-E founder, at Topsfield.

1912—First electrically propelled ship in the United States Navy, the USS *Jupiter*—later the aircraft carrier *Langley*—is launched.

The National Electric Lamp Association is dissolved, continuing as the National Lamp Works.

The General Electric Pension System is established.

1913—E. W. Rice, Jr. becomes President of General Electric.

C. A. Coffin is elected Chairman of the Board.

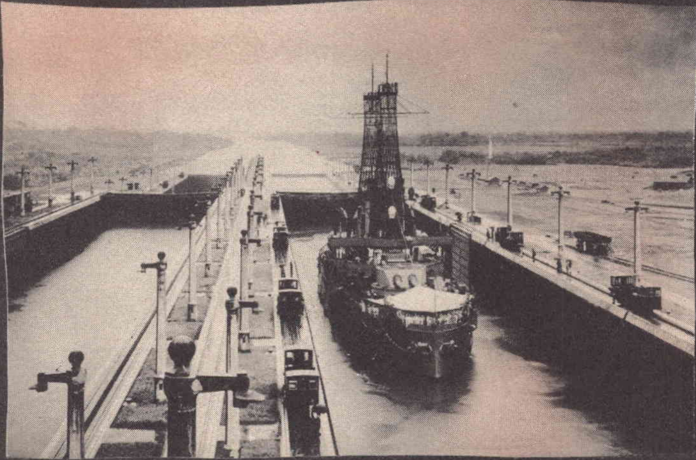
Dr. Langmuir's gas-filled tungsten lamp is commercially established, and Dr. Coolidge demonstrates the hot-cathode x-ray tube.

Nela Park opens officially. Ductile-tungsten lamp is patented.

1914—Panama Canal opens with E. M. Hewlett's selsyn system of interlocking controls. Called the "biggest electrical installation in the world," the Canal has a combined horsepower of 30,000.

The first fully automatic substation is equipped and put into operation by General Electric for Elgin & Belvidere Electric Railway.

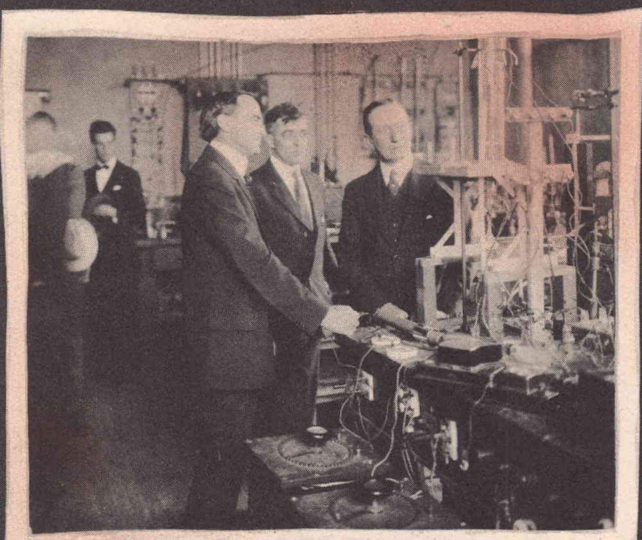
The Quarter Century Club is formed.



Electric mules ply the Panama's tow paths. Not so on the Erie.



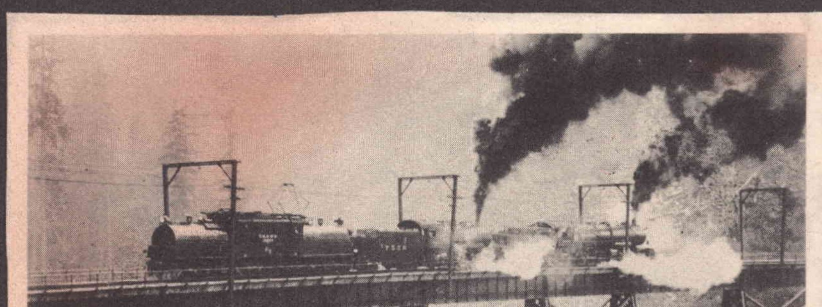
With electricity, it's like having a flock of servants.



1915 - The great Marconi visits the G-E Research Laboratory.



Liberty Bond rally at G-E.



G-E electric locomotive wins tug-of-war with two steamers.

1917—EXPANSION OF BUSINESS (from ANNUAL REPORT)

The amount of sales billed was $196,926,317.79, an increase of $62,684,027.80, or 47 per cent over the previous year . . .

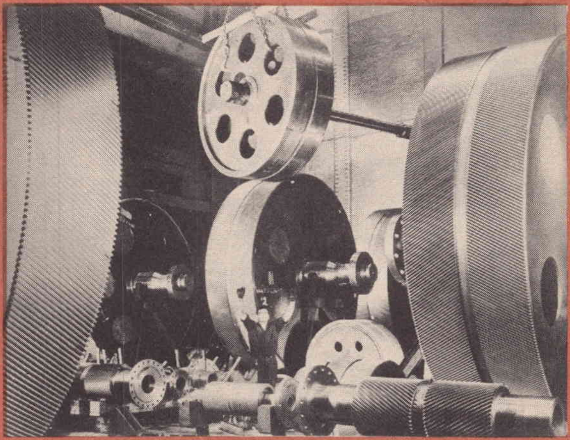
The large increase in sales during the last two years has made it necessary to add to manufacturing facilities to an extent entirely without precedent . . .

The total factory floor space in recent years has been as follows:

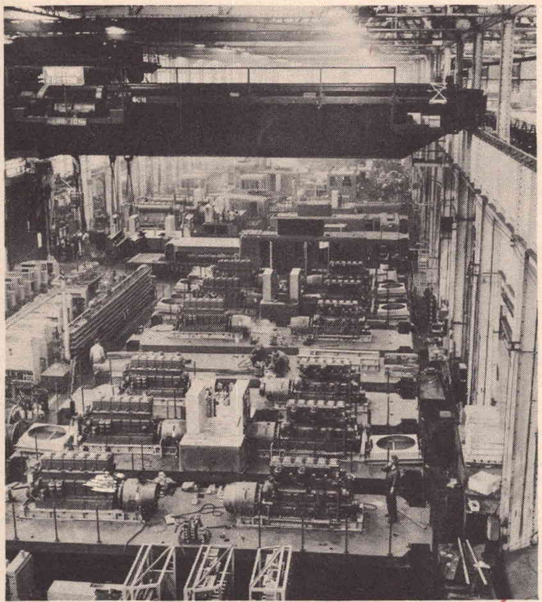
1909	7,000,000 square feet
1911	9,770,000 square feet
1913	13,900,000 square feet
1915	14,880,000 square feet
1917	17,573,000 square feet



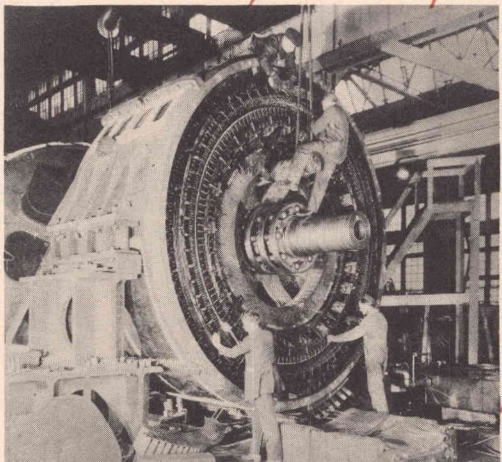
W.W. I bond rallies had their counterparts in War II. G-E people not only worked hard, they gave generously.



Giant gears such as these have played "middle man" to churning propellers and G-E electric ship propulsion motors since 1912.



G-E locomotives no longer play tug-of-war; they have proved themselves. In this modern shop at Erie are built switching locomotives, workhorses of the country's rail lines.



Like the great "bull" gears above, this motor is also massive. But without it, an ocean-going vessel would never leave its dock.

Two great radio pioneers of our century—Marconi, and G.E.'s Dr. E. F. W. Alexanderson.



1915—W. D'A. Ryan lights spectacularly the Panama-Pacific Exposition.

The *Pacific* makes its trial trip with the first installation of General Electric geared turbines for ship propulsion.

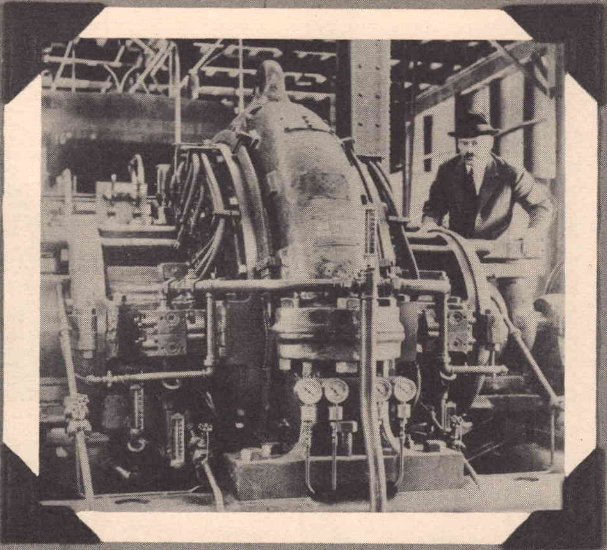
Saul Dushman, General Electric research physicist, develops the world's first high-voltage vacuum rectifier.

1916—Dr. Alexanderson makes an early demonstration of two-way radio telephone, between Schenectady and Pittsfield, and develops a multiple-tuned antenna.

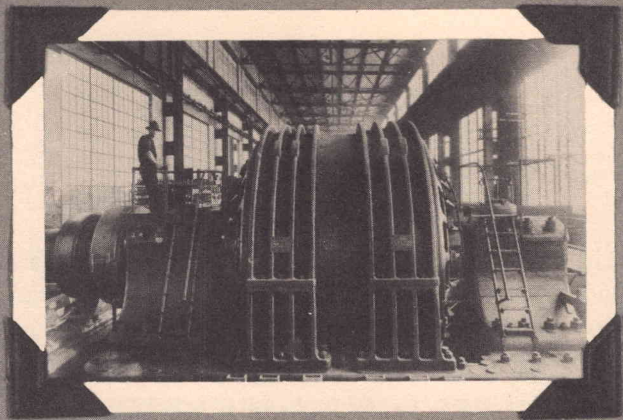
W. D'A Ryan develops a "Path of Gold" lighting installation for Market Street, San Francisco.

1917—General Electric installs the first fully automatic hydroelectric station for the Iowa Power Co. at Cedar Rapids, Iowa.

Dr. Alexanderson's 200-kilowatt alternator is given a practical trial at the American Marconi Company's New Brunswick transmitter, which was to become important as the center of America's transoceanic radio activity during World War I.



Alexanderson with alternator at Rocky Point, Long Island.

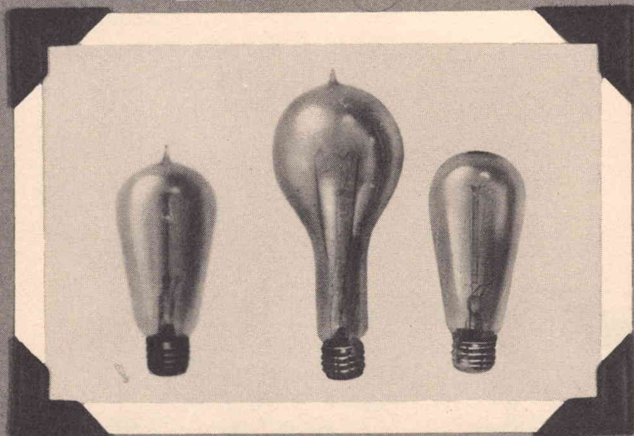


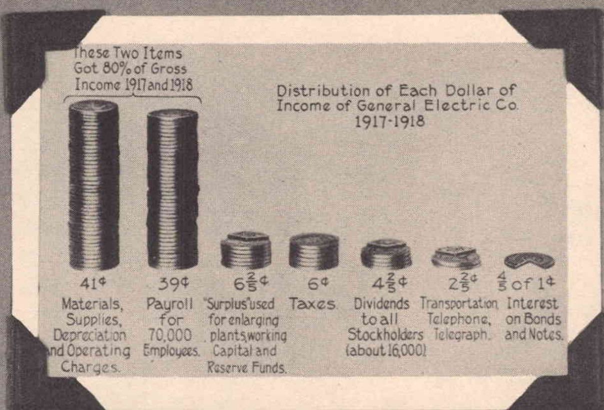
5,000-hp motor drives a 40" Bethlehem blooming mill.

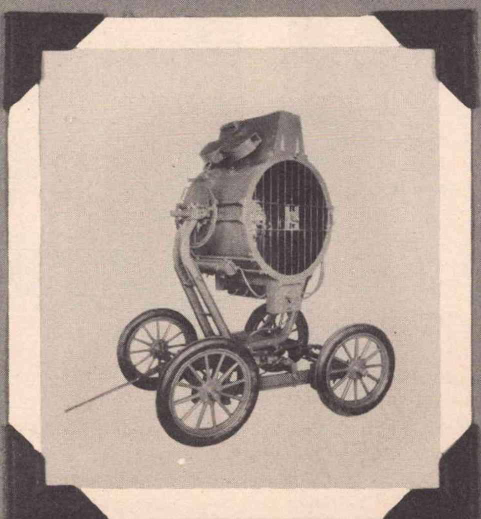


1920

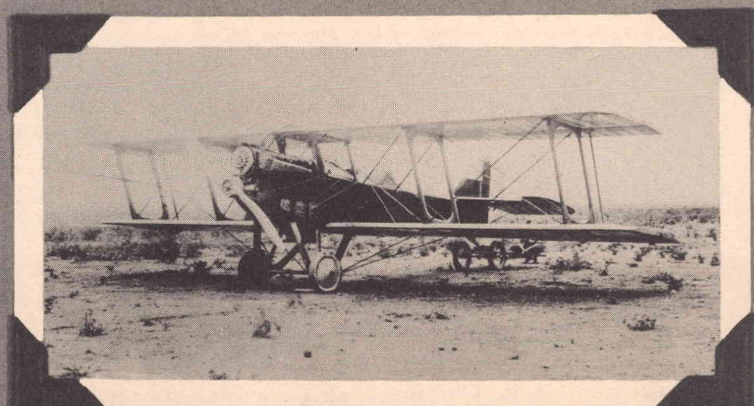
And now, a vacuum lamp without tip.





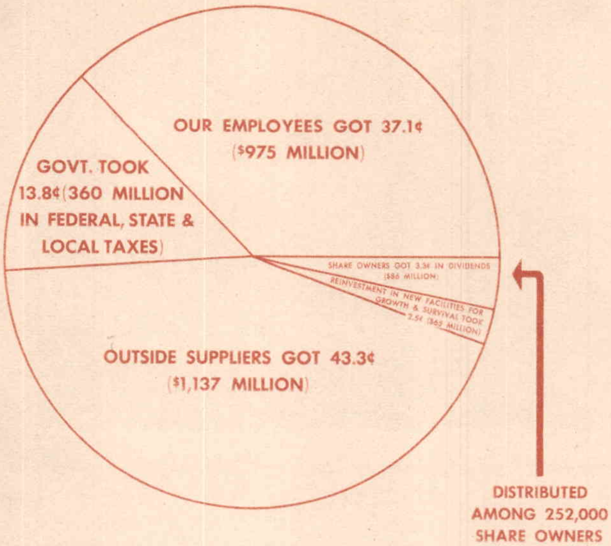


Born in wartime, searchlights heralded peace.



LaPere Liberty-motor plane, with G-E supercharger, makes altitude record.

IN 1952--OUT OF EVERY DOLLAR RECEIVED . . .

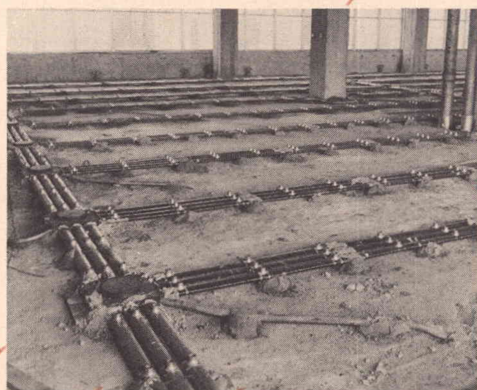




Started in 1895, the name General Engineering Laboratory was applied in 1919 to Schenectady building at right. Now occupying both buildings, a staff of nearly 2,000 engage in 62 separate fields of engineering.



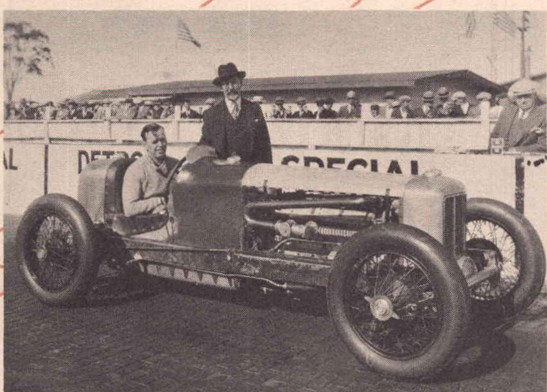
G.E.'s Construction Materials people supplied the UN building with vast quantities of conduit, wire and cable, and wiring devices.

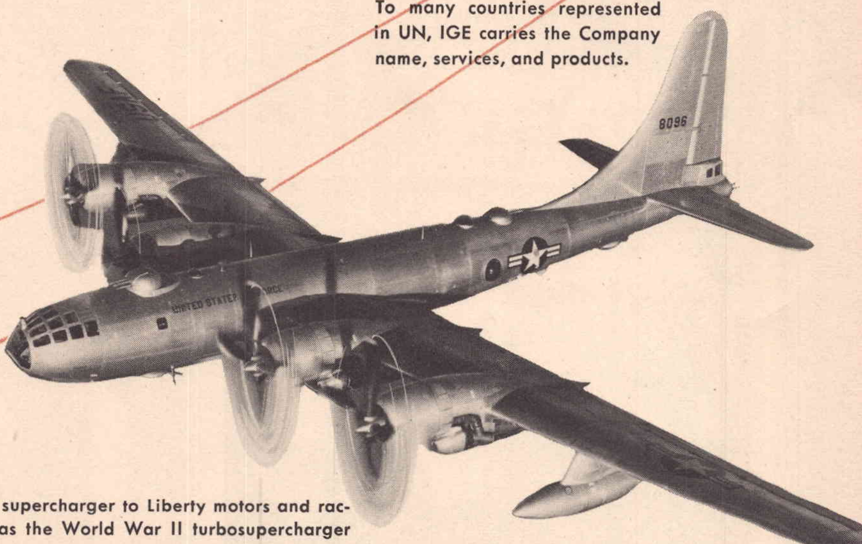


This picture shows a UN floor under construction, with its channels of electric power.



To many countries represented in UN, IGE carries the Company name, services, and products.





Sanford Moss persisted in applying his supercharger to Liberty motors and racing automobiles. Climax of his work was the World War II turbosupercharger in such planes as the B-29, which, because of it, flew high above the enemy.

1918—The first General Electric exhaust-driven supercharger is installed on a Liberty airplane engine.

War period spurs development by C. A. B. Halverson of the open-type military searchlight and the development of the horizontal spread projector for lighting shipyards and other large areas.

1919—General Electric acquires the Cooper-Hewitt Company.

Dr. Alexanderson's new alternator revolutionizes radio.

First sectional drive for the manufacture of paper is sold by General Electric to the Crown Willamette Paper Company.

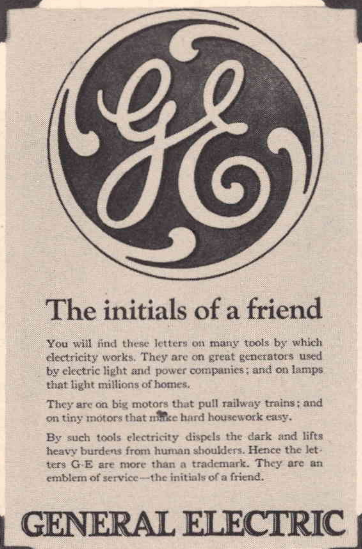
G.E. announces lamp bulbs without tips.

Business Training Course is organized for college graduates.

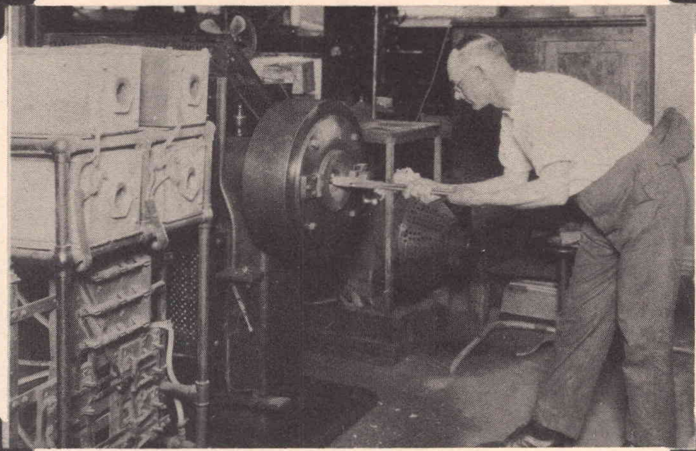
The General Engineering Laboratory is formed.

Gerard Swope becomes President of the newly incorporated International General Electric Company.

1920—G.E. acquires control of the Victor X-ray Corp. and the Locke Insulator Corp. Radio Dept. is formed in Schenectady.



A great, new slogan inspires confidence.



1923 Research Laboratory photo - the swaging of tungsten anodes for Coolidge tubes.



Owen D. Young
Board Chairman ('22)



X-ray, life-saver in war, and now ('22) in peace.



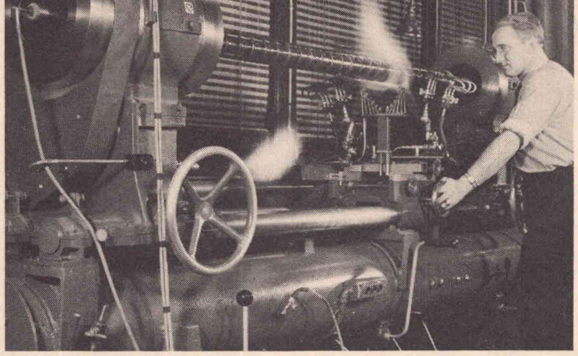
Miracle! From Radio WGY comes voice and music. Note lampshade mike.



Gerard Swope ('22) becomes 3rd president of General Electric.



Steinmetz is dead - after traveling in the West - others must take his place.



Hydrogen-oxygen flame seals together and anneals the glass sections of a 2-million-volt x-ray tube. This lathe was designed and built by the X-Ray Department.



Five 1951 Coffin Award winners—of the 27 presented that year to members of the General Electric family—receive their certificates from Vice President Lang.

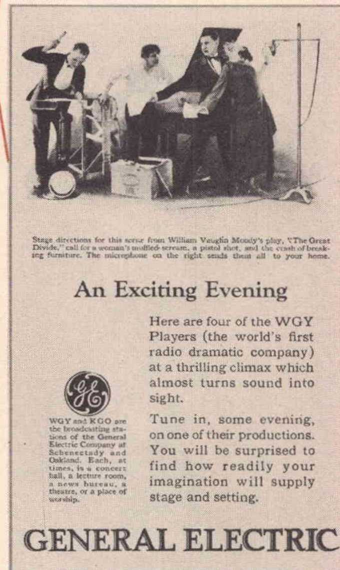
CHARLES A. COFFIN FOUNDATION (from 1922 ANNUAL REPORT)

On May 16, 1922, Mr. Charles A. Coffin, in his 78th year, retired from the active leadership of the General Electric Company. Mr. Coffin has been identified with the development of the electrical industry since 1882. He was the founder and creator of the General Electric Company, of which he has been the inspiration and leader for thirty years.

As an expression of appreciation of Mr. Coffin's great work, not only for the Company but also for the entire electrical industry, and with the desire to make this appreciation enduring and constructive, as Mr. Coffin's life and work have been, the Board of Directors created on his retirement the "Charles A. Coffin foundation" and set aside the sum of $400,000. The income is to be used to encourage and reward outstanding service in the electrical field, by first, giving prizes to employees of the Company; second, recognition to lighting, power, and railway companies for improvement in service to the public; third, awarding fellowships to graduate students; and, fourth, providing funds for research work at technical schools and colleges to advance the art and industry. Each step forward along these lines will be of direct benefit to the industry as a whole and to your Company.

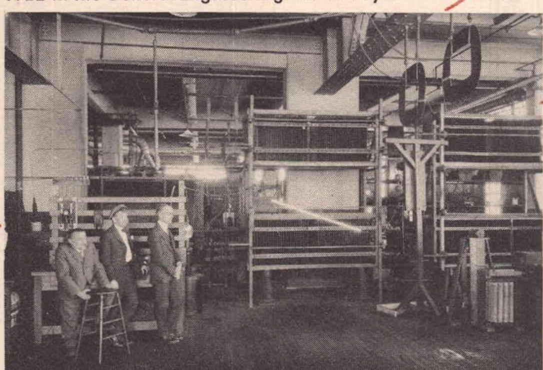


The drama has more than dialog and background music... and here the sound men of 1922 created illusions for WGY's thousands of listeners. Broadway had come to the living room, in city house and farm.

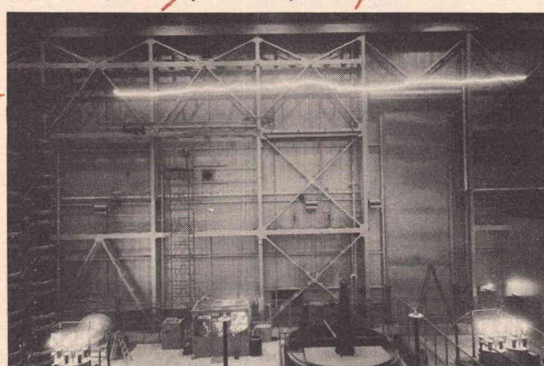


And such ads as this encouraged people to investigate—and to buy crystal sets and earphones.

First artificial lightning-producing generator, as it was demonstrated by Steinmetz in 1922 in the General Engineering Laboratory.



Today, in Pittsfield's new laboratory, generators produce 15 million volts, in contrast to 120,000 volts produced by Steinmetz.



1921—First turbine-electric cargo ship, SS *Eclipse*, with G-E equipment, completes an initial voyage of 26,500 miles.

Plane with G-E supercharger sets altitude record: 40,800 feet.

1922—Chairman Charles A. Coffin and President E. W. Rice, Jr. retire from active leadership of the Company, Mr. Coffin in his 78th year. Mr. Rice becomes Honorary Chairman of the Board; Messrs. Gerard Swope and Owen D. Young succeed them as President and Chairman.

The Charles A. Coffin Foundation is announced.

WGY goes on the air with its first test concert.

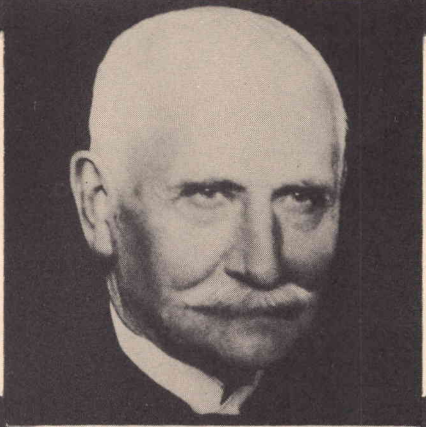
The Lynn Works is divided into the West Lynn and River Works, and Thomson Research Laboratory is established under that name in Lynn.

1923—The Sprague Works becomes the Bloomfield Works, and the Oakland Works is established.

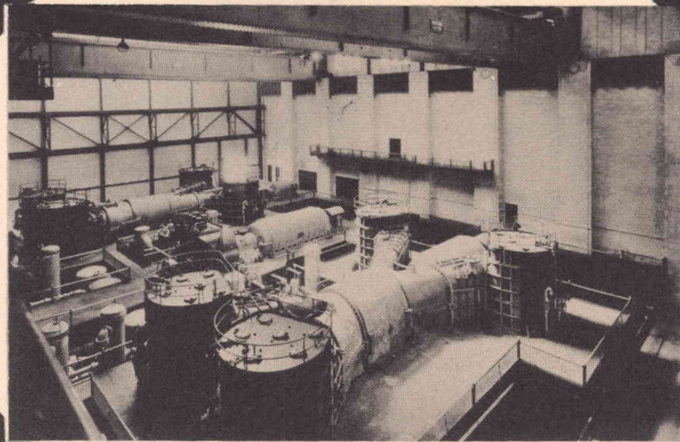
Continuous transcontinental air mail service is inaugurated by the Post Office, via night route marked with G-E searchlights.

Charles P. Steinmetz dies.

Charles A. Coffin
Dies at Age 81



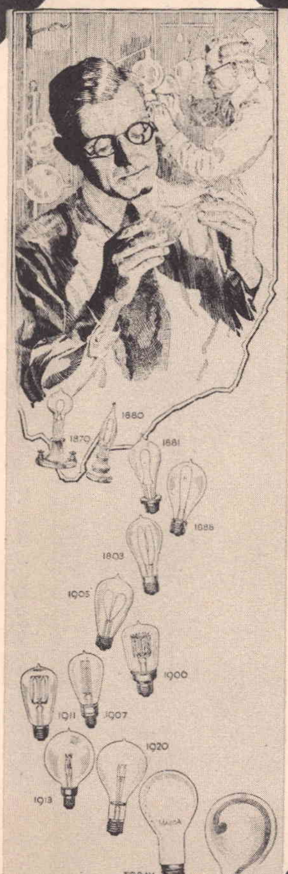
"As builder of machines Charles A. Coffin earned conspicuous place and received deserved reward; as builder of men he put his country under incalculable obligation." New York Evening Sun, July 16, 1926.



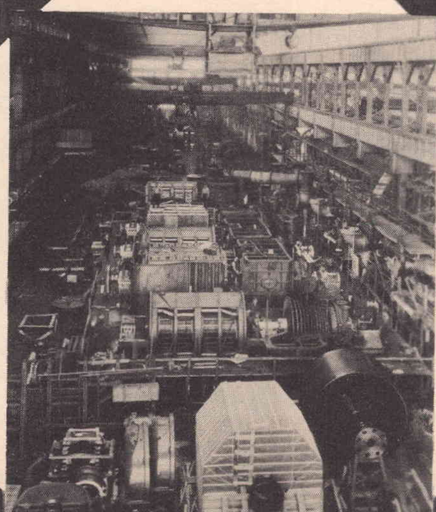
State Line Station, Hammond, Indiana.



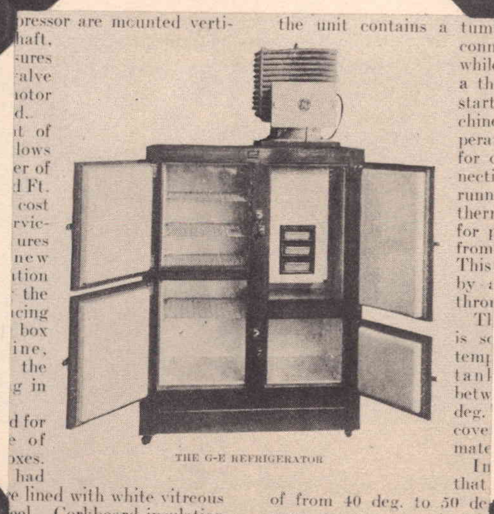
Coffin at right, Swope 5th from right, at 1924 Directors' meeting, Pittsfield.



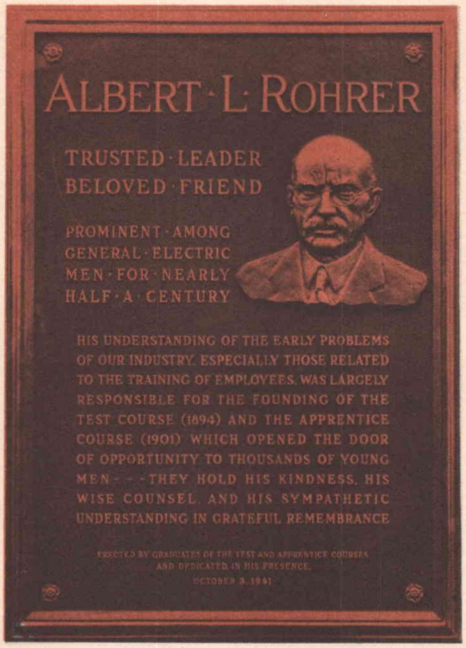
Not quite five lamp decades.

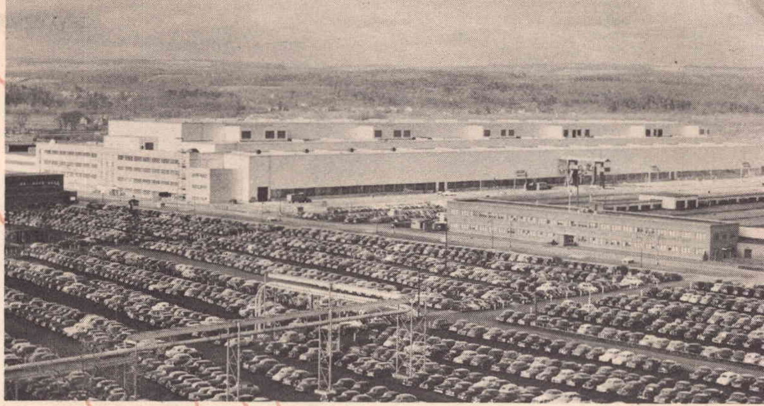


60 in Sch'dy: the largest electrical workshop.


pressor are mounted verti-
the unit contains a
THE G-E REFRIGERATOR
e lined with white vitreous
eel. Corkboard insulation
of from 40 deg. to 50 de
room temperature, is bes

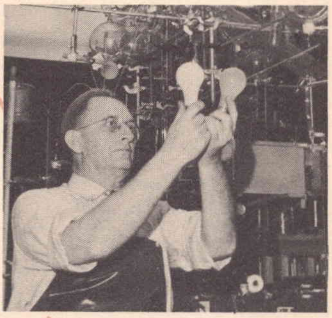
This is new! Not much room under it for drippan!





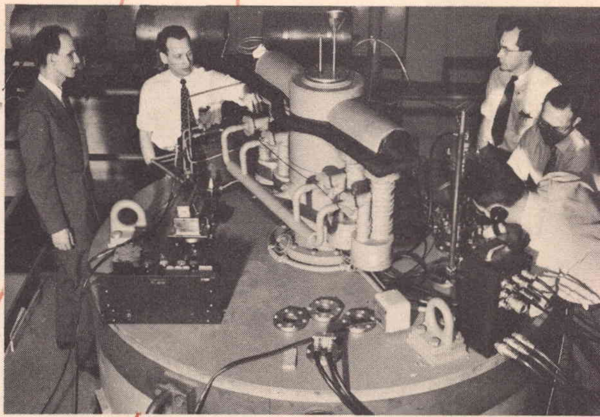
Completed in 1949, Schenectady's new turbine building is a vast expanse of steel and concrete spreading over 20 acres of land.

Today's white inside-finish lamp, in right hand, gives nearly perfect diffusion of light—a contrast to the standard inside-frosted lamp of 1924 origin.

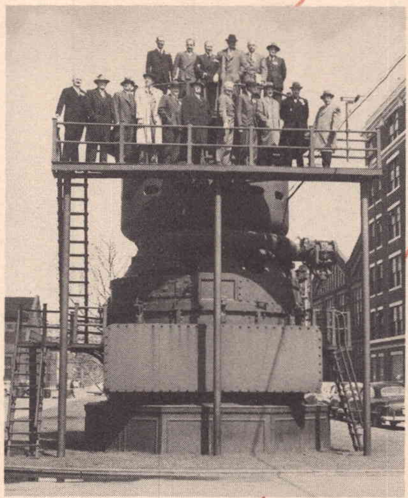




Experience and intensified development gave birth to totally enclosed operating mechanism in a sheet-steel, copper brazed case, and it was hermetically sealed.



Today's Test men have daily contact with key engineers; here they discuss progress of a new tool for studying the atomic nucleus, a 300,000-volt synchrotron.



In 1952, the Board of Directors met in Schenectady, and like thousands of others climbed G.E.'s first big turbine.



Latest of a long line—and still hermetically sealed—this model is both refrigerator and storer of frozen foods.



Since Company's founding, about 25,000 men have gone through Test. But even before, there were Test men, like this early-nineties group at Thomson-Houston.

1924—Inside frosting is introduced for incandescent lamp bulbs.

KGO,* second G-E radio station, goes on air from Oakland, Calif.

Steinmetz Memorial Scholarship is established for employees' sons.

1925—G.E. announces first hermetically sealed domestic refrigerator.

The first 600-pound turbines in commercial use, made by G.E., start operation for the Columbia Gas & Electric Company.

KOA, third G-E radio station, goes on air from Denver.

The Test alumni Association is founded.

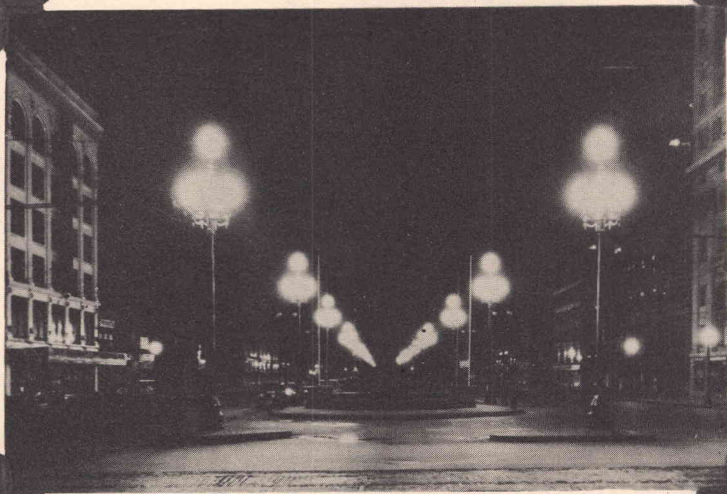
1926—Charles A. Coffin dies at the age of 81.

Largest turbine-generator in the world, a 208,000-kw unit, is being manufactured for the State Line generating station.

Highest voltage yet produced by man, 2,100,000 volts, is generated at Leland Stanford University with G-E transformers.

First all-electric car dumper on Great Lakes operates at Toledo.

The keel is laid for the SS *California*, first large passenger ship with electric drive; G-E equipment.



1928 - Washington Blvd., Detroit. The best-lighted street in the world.



Get paid for an idea? Many do at G.E.



Dr. Whitney and artificial fever machine.



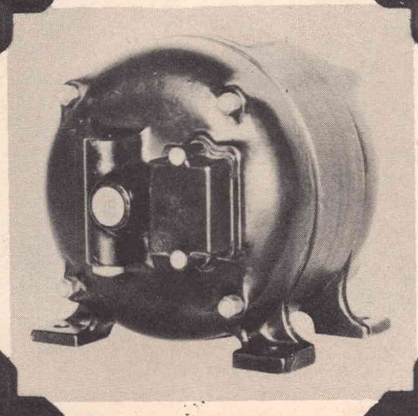
"The Queen's Messenger" 1st televised play.



Bit by bit, motors take over the housework.



Power station on the Mohawk. Beautiful - even at night.



Motors are now better than ever.

A $4500 suggestion award (1952), one of highest, means a mighty happy family.



SUGGESTION PLAN
(from 1928 ANNUAL REPORT)

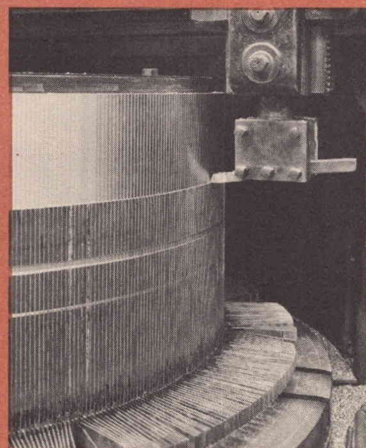
Response from our employees has been gratifying, and the number and quality of suggestions have steadily improved. The highest single award has been $1200... During 1928, $62,381 was paid to factory employees for suggestions. During that year, 18,077 suggestions were received... Thirty-one per cent of those submitted were adopted.

(from 1952 Annual Report)

Awards made during 1952	$579,000
Awards made during last 30 years	$4,321,000



In November, 1949, G-E television station WRGB marked its 10th year on the air. Early telecasting was done, in 1928, by G-E radio station WGY at Schenectady.



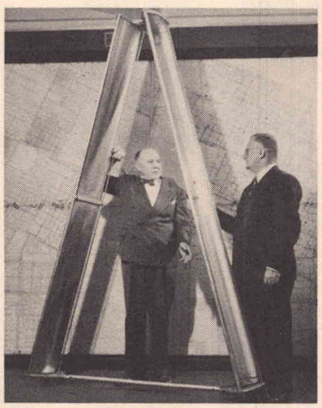
This Carboloy tipped tool, in middle age, had already cut more than 4400 miles of copper and mica between 1930 and 1937.



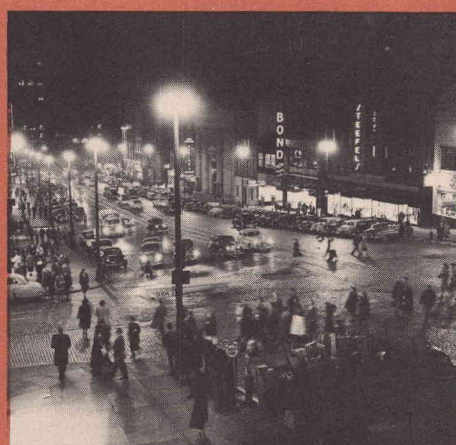
Since 1923, G.E. has lighted many athletic fields, among them several of the largest football and baseball stadiums.

The new Form G motor makes predecessors look like heavyweights. Same power, but 50% less weight.





Detroit, always up-to-date in lighting, lays claim to nation's first major fluorescent street-lighting system. Eight-foot G-E fixtures light Wyoming Avenue.



The main street in Albany, New York, is one of hundreds in the United States whose nighttime "suns" are made by G.E.



Unlike the woman on the opposite page, this housewife has an electric cleaner to do her bidding.

1927—The Company forms G.E. Realty Corp. and Bailey Meter Co.

G.E. announces "talking" equipment for sound motion pictures.

First experimental baseball game under lights played at Lynn.

The Electric Refrigeration Department is set up.

Gerard Swope Loan Fund established to give educational opportunities to employees and their sons; also supplementary Loan Fund.

1928—Carboloy is announced and Carboloy Co., Inc. is formed.

G.E. applies hydrogen cooling to a synchronous condenser.

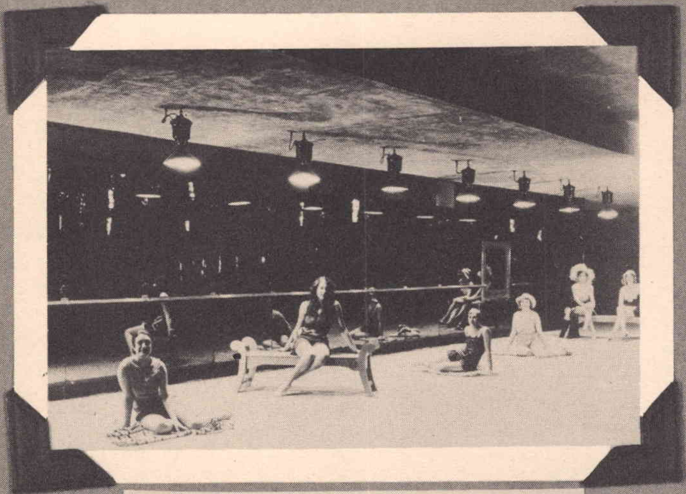
G-E lights make a Detroit street the world's best-lighted.

WGY broadcasts first television drama. General Electric makes public demonstration of radio transmission of photographs.

1929—General Electric Supply Corporation is formed.

Great Northern Railroad opens largest railway tunnel in America, through Cascade Range, changing from steam to General Electric operation.

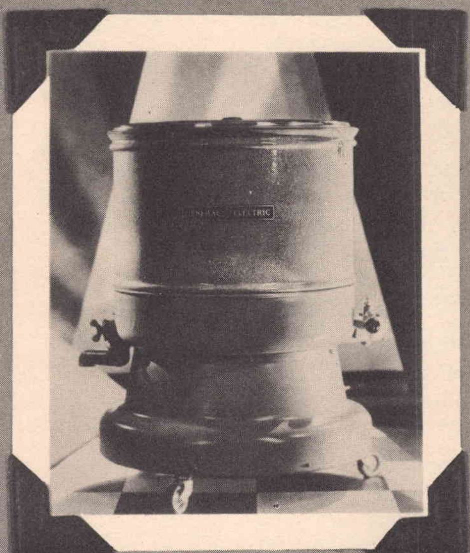
National Mazda lamps are to be known as G-E Mazda lamps.



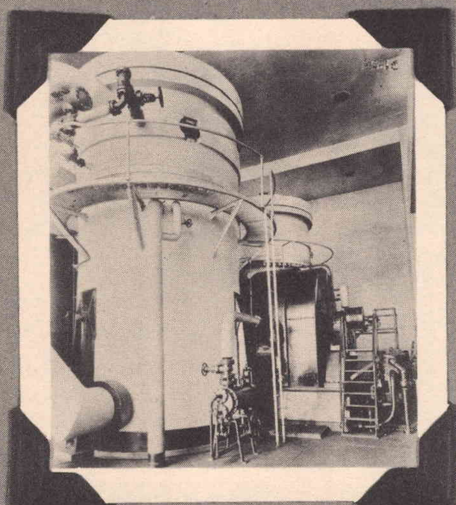
A suntan (by G.E.) indoors!



A traveling meter exhibit.



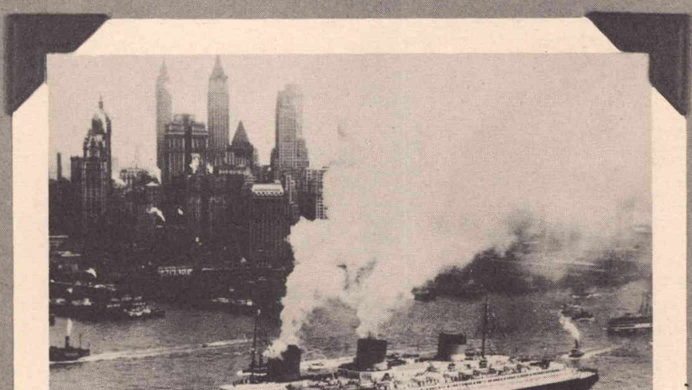
G-E extractor washing
machine is oiled for life.



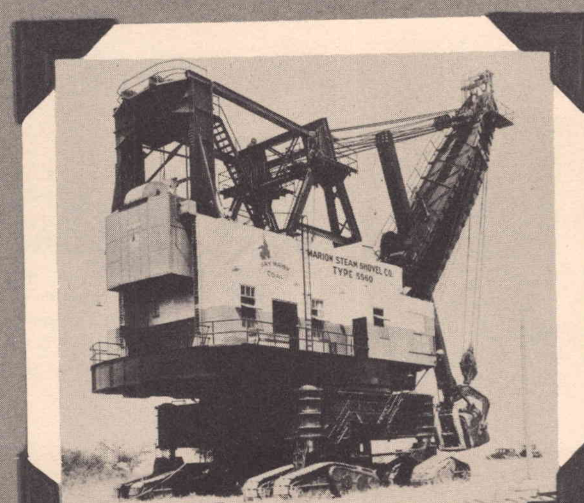
Mercury-turbine-generator
unit at Hartford, Conn.



G.E.'s Langmuir receives
Nobel Award, Sweden, '32.



Normandie, launched 1932, has
4 largest motors (G-E) built.



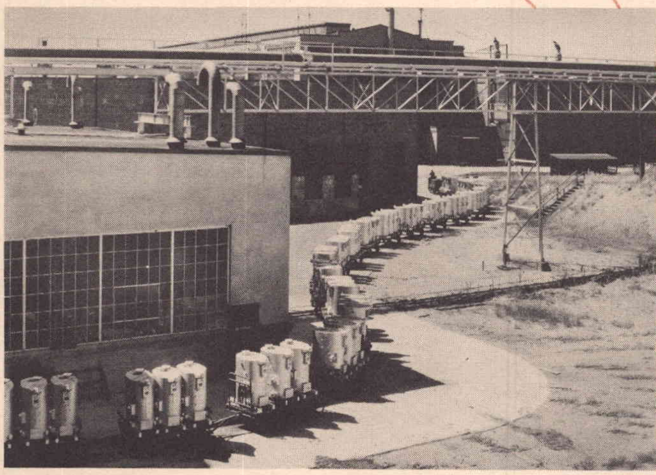
Big (GE powered) dipper
scoops 27 tons per min.

1950—A far cry from the 1930 exhibit van, left, was the More Power to America Special, 10-car apparatus exhibit train which toured the nation.





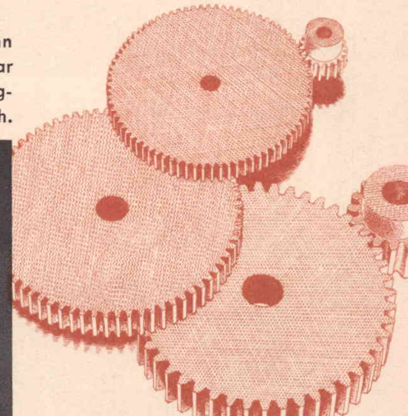
More than 2000 G-E products, systems, and techniques were displayed in the G-E showcase-on-wheels. Many, like this steam turbine exhibit, could be operated by the train's visitors.



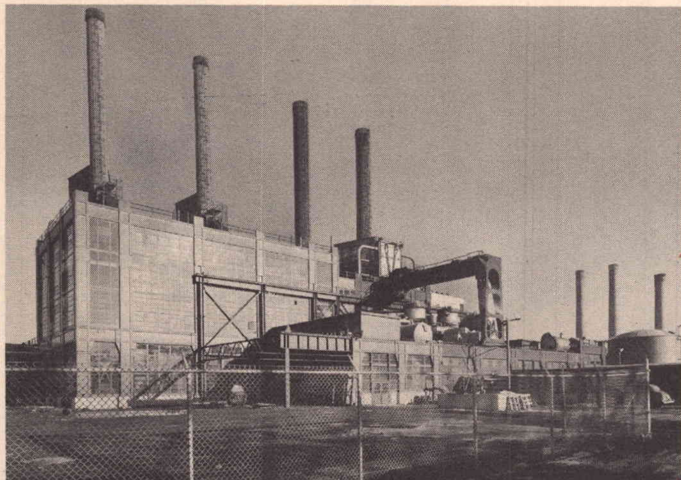
In 1932, G.E. put its first oil furnace into production. Burner units were made in Schenectady; boilers (above) were made in Pittsfield. Units and boilers were assembled at customer's home.

In 1906, Schenectady millwright John Miller, seeking an antidote for wear in d-c motor gears, developed a long-wearing, silent gear out of cloth.



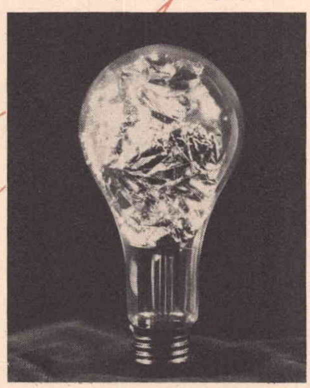


Descendants of Miller's cloth gears are now made of G-E laminated *Textolite*.

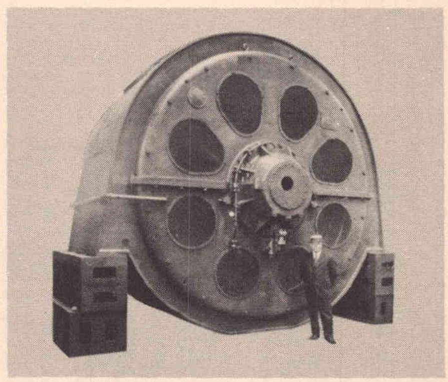


Mercury turbine plant at Schenectady Works, 1948. Plant produces more electricity with given amount of fuel than any equipment of comparable size by first running mercury vapor through one turbine, then heating water to steam with residual heat and using that to run a regular steam turbine.

In 1930, G.E. announced the revolutionary *Photoflash*, a fireless, odorless, smokeless flash lamp for photographers.



This giant motor, destined for Dollar Line service, was designed to turn an ocean liner's propellers at 125-rpm speed.



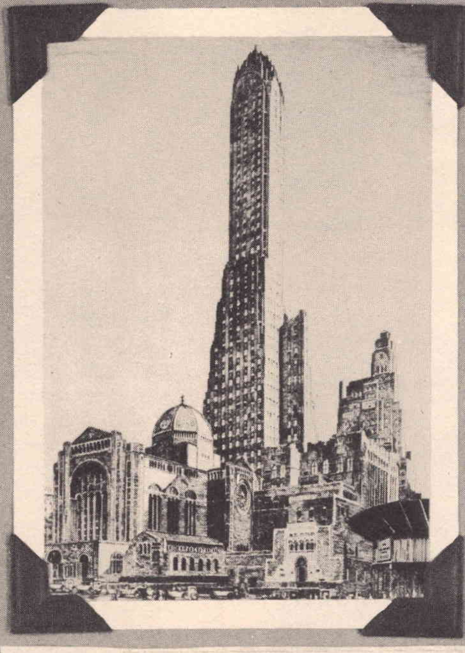
1930—The Plastics Department is formed.
Research Laboratory announces 500,000-volt x-rays, more than twice the previous voltage, using the Coolidge cascading principle.
All-welded steel cargo vessel is launched; G-E welding equipment.
The Edison Lamp Works moves from Harrison to Nela Park.
Television images by radio publicly exhibited in Schenectady.

1931—General Electric introduces the flat-plate ironer.
Incandescent Lamp Dept. announces a water-cooled lamp.

1932—Dr. Langmuir receives the Nobel Prize in chemistry.
Ten million volts of artificial lightning are produced for the first time, at the Pittsfield Works.
General Electric announces Pyranol, a new liquid insulator.
The French superliner, *Normandie*, is launched, using four largest motors ever built, manufactured by G-E associate in France.
The Air Conditioning Department is formed. The General Electric oil furnace and air conditioner are introduced.



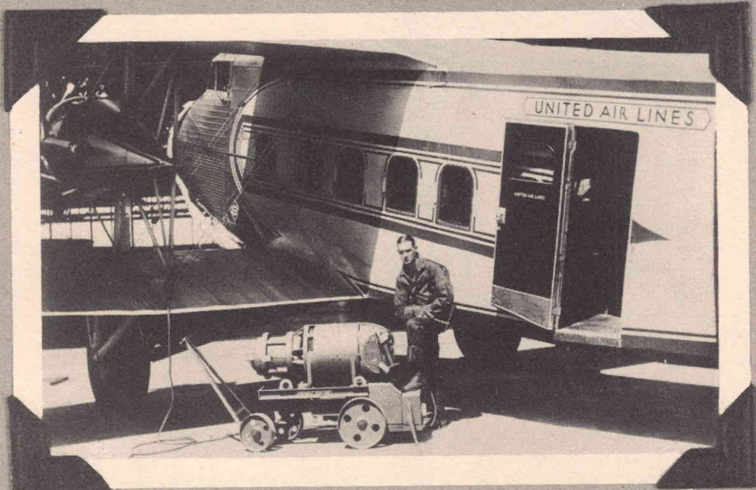
G.E. made heaters for
World's Fair lecturers.



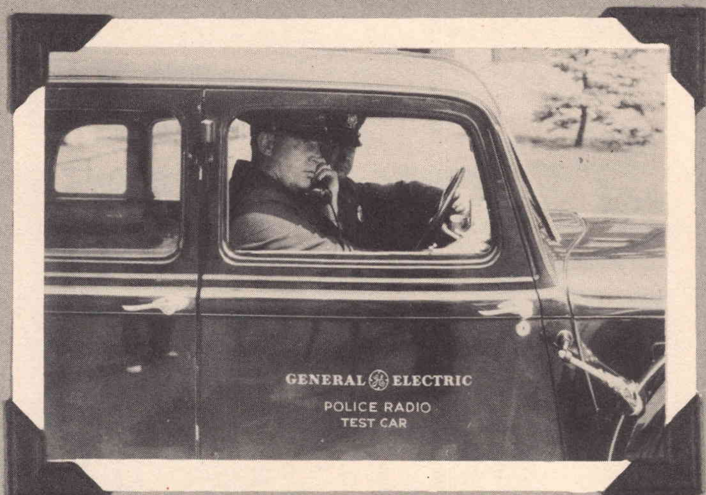
1933 – G.E.'s new Lexington
Ave. office building.



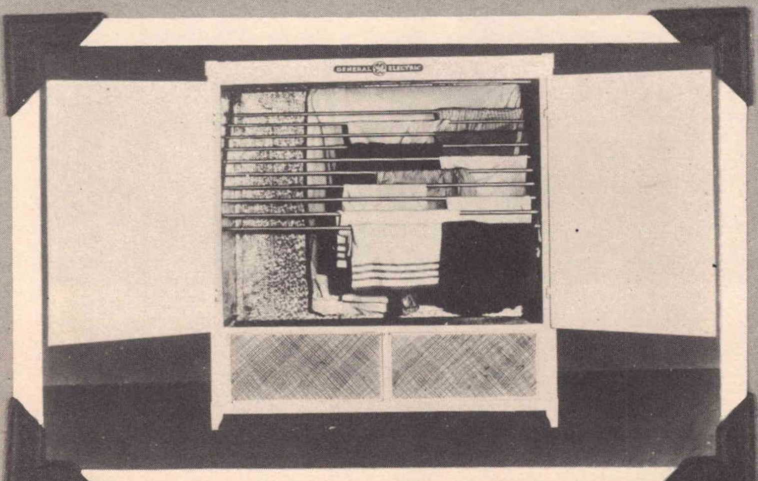
1935 – G.E. announces an
electric garbage disposer.



Boeing Air Transport, Inc. uses G–E
welder in airplane fabrication. 1933.



Boston police have G–E
radio–telephones like this.



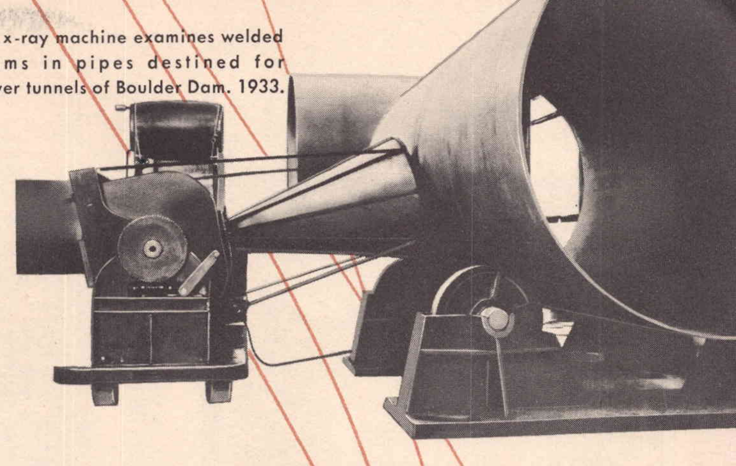
1934 – This new General Electric
dryer will do 8 sheets <u>at once.</u>



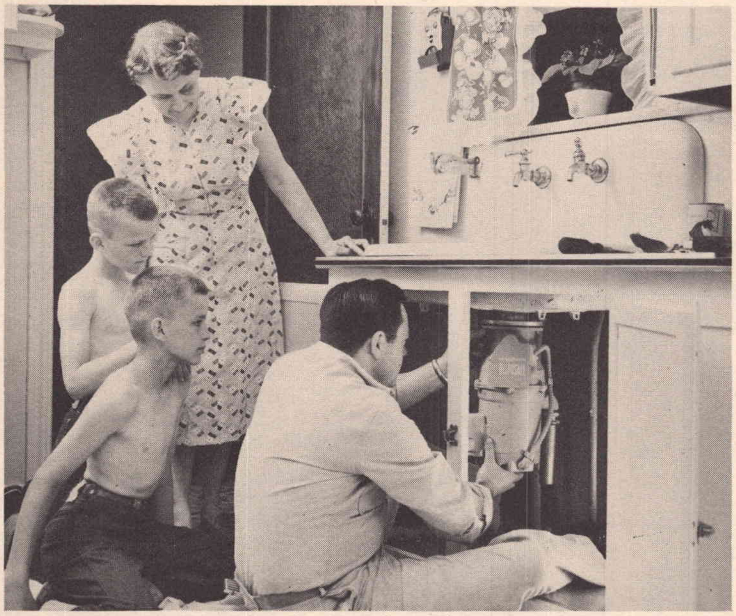
This Univex camera, made
of G–E plastics, costs 39¢.



No longer used exclusively by police, as in 1934, the radio-telephone is now widely found in taxis, ferryboats, Civil Defense vehicles, firetrucks, and ambulances. Here men broadcast regatta with G-E set.



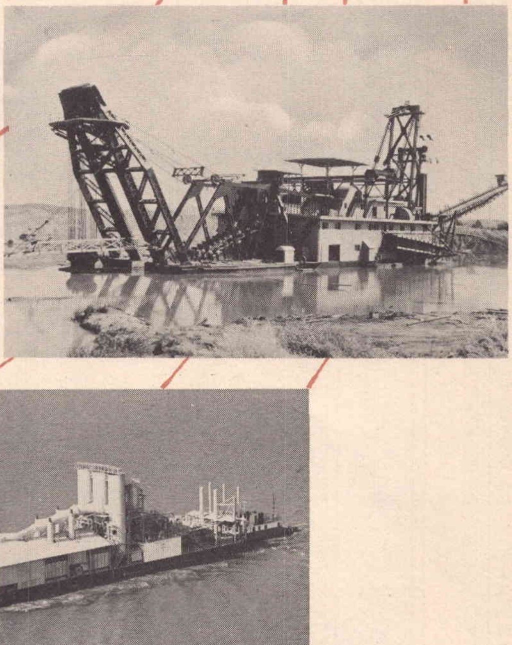
G-E x-ray machine examines welded seams in pipes destined for power tunnels of Boulder Dam. 1933.



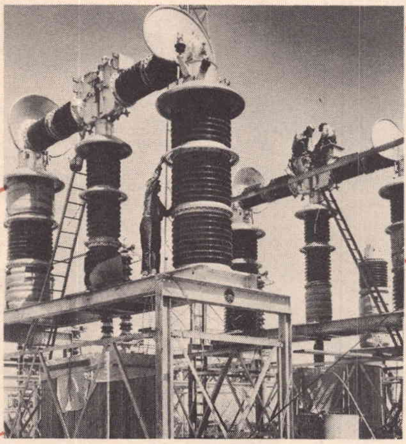
It was in Jasper, Indiana, that electric garbage disposers were first installed on a city-wide basis, in 1950. Since that time, word of the plan's success in Jasper has brought similar installations to Herrin, Illinois, and Mt. Dora, Florida.



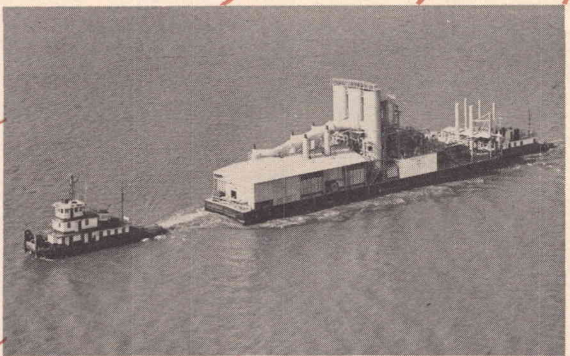
Although G-E plastics people still turn out small molded shapes like the Univex camera of the thirties, the *Textolite* Monotop is one of the larger products. It is a one-piece kitchen counter.



1935—This 3220-ton G-E powered gold dredge would have made the Forty-niners' eyes pop out. It had a digging depth of 150 feet.



This great G-E impulse oil circuit breaker is being installed for service at Boulder Dam, Colorado. 1936 photo.



The Freeport Sulphur Mining Company's new floating mining plant, first ever constructed, works Louisiana marshlands. General Electric turbo-generators and transformers help out.

1933—Observatory telescopes, using G-E phototubes, open A Century of Progress at Chicago with light from the star Arcturus.

The first regular installation of sodium highway lighting, at Schenectady, is announced.

The General Electric Institute at Nela Park is dedicated.

1934—The *Zephyr*, a new type of streamlined diesel-electric train, equipped by G.E., is turned over to Chicago & Burlington & Quincy RR.

G.E. announces a line of domestic gas-burning furnaces.

A mobile two-way radio system is developed and demonstrated by G.E. for the Boston (Mass.) Police Department.

1935—The Research Laboratory develops a new magnet, called Alnico, which can support more than 60 times its own weight.

The first major league night baseball game is played under G-E lights at Cincinnati.

The Disposall electric garbage disposer is announced by G.E.

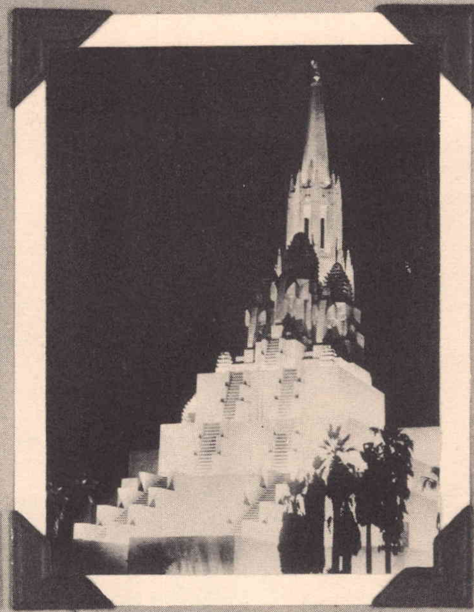
G.E. makes metal radio tubes and first radio sets using them.



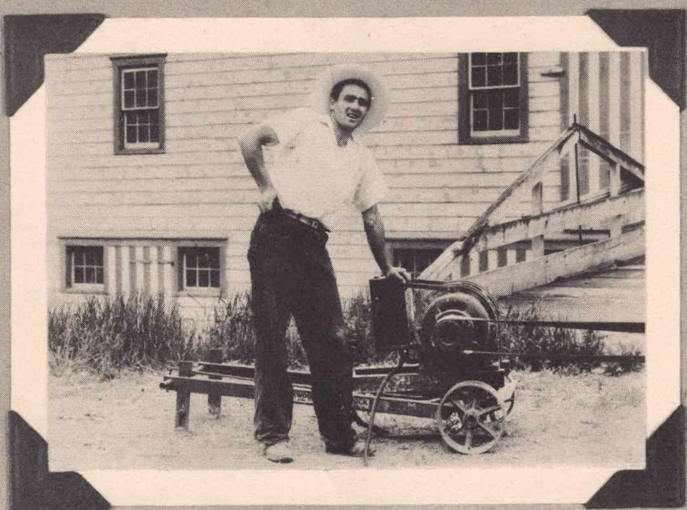
A $17\frac{1}{2}$-mi. stretch of sodium lighting near Schenectady.



Out of the Lab: glass that is nonreflecting.



Golden Gate Exposition lights, 1938.



Electric motor is a hired hand giving the farmer tireless horsepower.



Retired dad and working daughter represent 4 generations at Lynn.



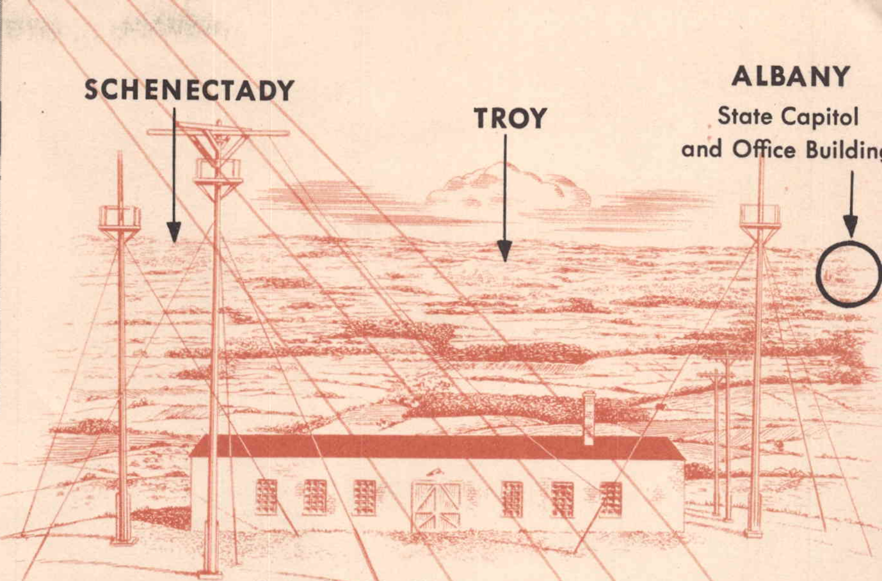
'36 Pennsylvania electric locomotive from G-E shops in Erie.



Double duty for electric blanket at Lake Placid ice operetta.



Once a startling idea in the Research Laboratory, the automatic blanket has gained widespread acceptance. Weight is relatively nonexistent; temperature is dialed and stays put.



Engineers said a TV transmitter atop the Helderbergs would serve three cities. WRGB's transmitter there now, does all this, reaches into nearly 300,000 homes.

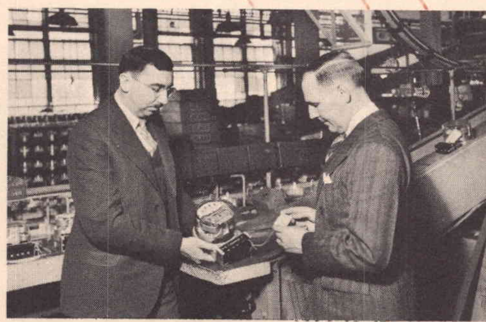
EDUCATIONAL ACTIVITIES (from 1937 ANNUAL REPORT)

"There is no problem more important in safeguarding the future of your Company than that of providing adequately trained personnel. In order to do this your Company has been a pioneer in developing special forms of training to prepare young men for the intricate problems with which they are confronted in the electrical industry. For example, the Student Engineering Course, known as the Test Course, dates from the formation of the Company in 1892. Each year many technical graduates are recruited from leading colleges and universities. These young men receive... experience in testing apparatus, supplemented by courses in engineering and business training...

"In the same way, each year young men are recruited... for the Business Training Course, where they receive intensive training... in accounting, finance, and commercial law, while they are employed in accounting and other nontechnical work.

"The Apprentice Courses for training young men in highly skilled production work date from 1901. These courses have supplied, in addition to skilled mechanics and draftsmen, many foremen and factory supervisors."

In 1953, training programs, in addition to the above, include Marketing, Employee and Plant Community Relations, Chemistry and Metallurgy, Physics, Advertising, Manufacturing, and Sales.



The Company's 19,000,000th meter was completed at the West Lynn Works in 1938... as the 85th birthday of the late Elihu Thomson was being observed.



Executive Vice President Charles E. Wilson (1938) spoke at the ceremony celebrating beginning of construction of G-E building for N. Y. World's Fair.



The 1937 room air conditioner was designed to furnish a high degree of comfort in single rooms of the home or office suite. It was semiportable and had a cooling rating of about two thirds of a ton.

1936—Development of the electric blanket is announced by the Research Laboratory.

The San Francisco-Oakland Bay Bridge is opened, lighted by more than 1000 G-E sodium luminaires.

1937—Charles E. Wilson is elected executive vice president and Philip D. Reed Assistant to the President of G.E.

Using a General Electric supercharger in his plane, Howard Hughes sets a transcontinental air record of 7 hours, 28 minutes, 25 seconds.

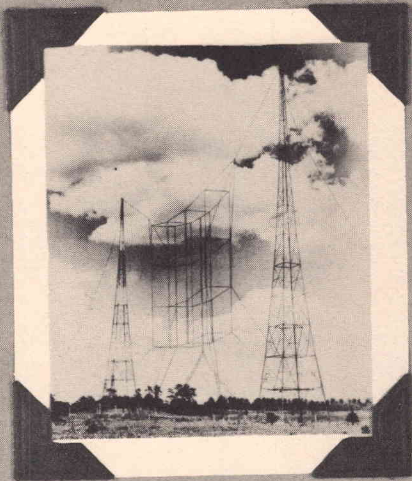
1938—G-E scientists make glass "invisible," eliminating glare by means of a very thin coating.

General Electric announces the development of fluorescent light.

The first run is made of the Pennsylvania Railroad's newly electrified Paoli-to-Harrisburg section. G-E equipment is used extensively.

G.E. is granted a licence to construct an experimental television transmitter in the Helderberg mountains near Schenectady.

General Electric radio station WGY opens new and modern studios.



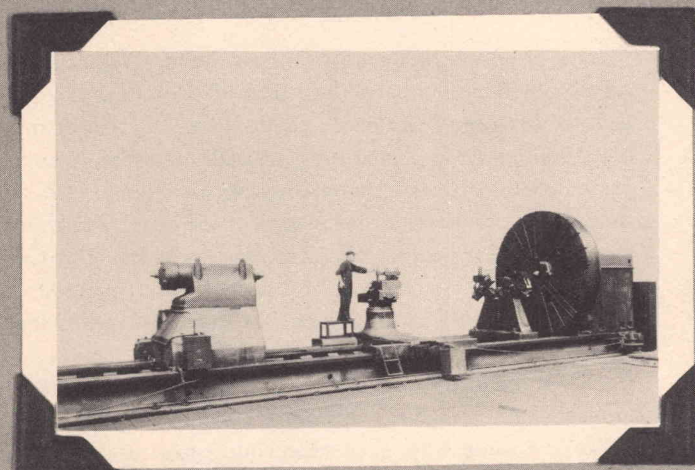
WGEA'S short waves
cross the seas.



You can see TV on this if you own
it and live near Schenectady.

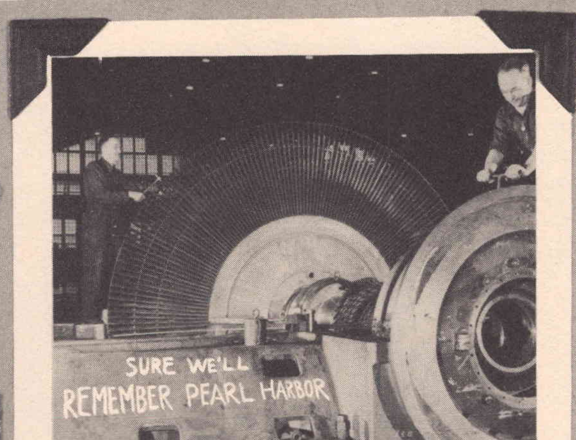


Messrs. Wilson, Reed, Trench
at 1940 Annual Meeting.

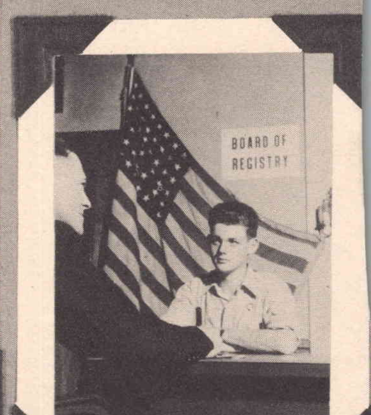


Come peace or war, this
120-in. lathe is ready.

WAR



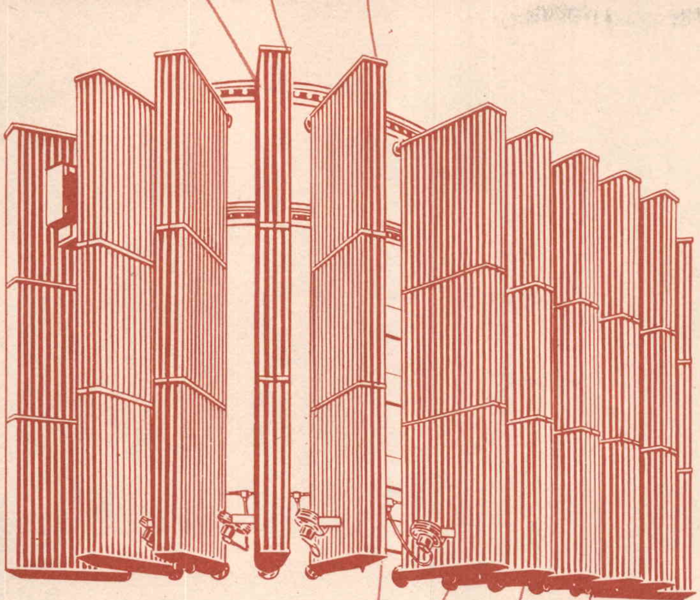
Everyone remembers!



G.E.'s young men
face up to new jobs.



First things first!

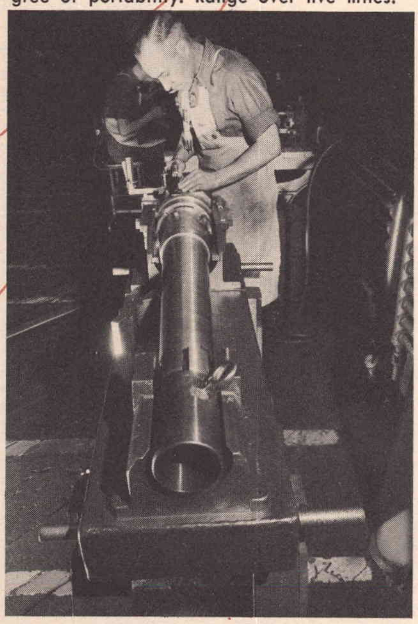


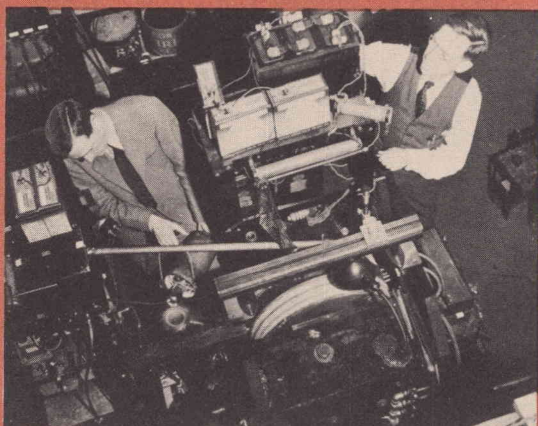
Pittsfield's heaviest transformer in 1940 weighed 491,000 pounds and required a special lifting device and two cranes to lift it.



On April 21, 1953, about 2500 share owners attended and participated in Annual Meeting at Schenectady.

Erie manufactured 75-mm howitzers, weapons with high striking power and a high degree of portability. Range over five miles.





A 1940 photograph, showing Dr. K. H. Kingdon and Dr. H. C. Pollock with spectrometer with which they isolated tiny quantity of U-235.



In '41, West Lynn devoted many of its facilities to manufacture of instruments for defense aircraft.



G.E. turned out hundreds of superchargers each month for the Air Force at Fort Wayne, Everett, and Lynn. Photo shows final assembly.



Training programs were streamlined. Courses were given in blueprint reading, machine operation, and product assembly.

1939—Radio & Television (later, Electronics) Dept. is formed, and first line of television and FM receivers is announced.

West Lynn celebrates 50 years of meter manufacture.

G.E. Vapor Lamp Co. and Incandescent Lamp Dept. merge into Lamp Department of the General Electric Company.

Board Chairman Owen D. Young and President Gerard Swope ask retirement; Philip D. Reed and Charles E. Wilson are elected to succeed them, respectively, as of January 1, 1940.

1940—Schenectady Works Laboratory dedicates 1,000,000-volt x-ray.

Drs. K. H. Kingdon and H. C. Pollock, of the Research Laboratory, isolate a tiny quantity of the rare form of uranium known as U-235.

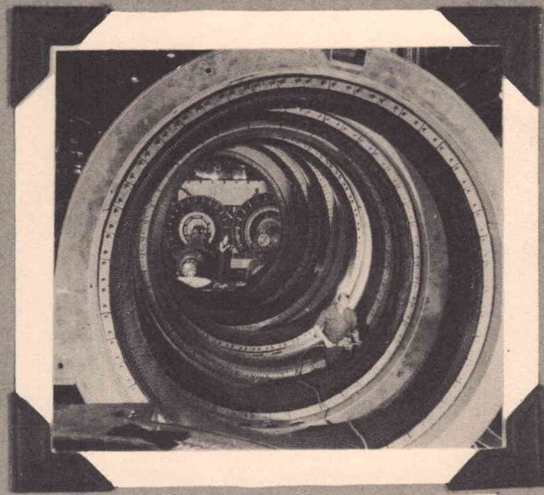
1941—It is announced that General Electric is the largest producer of finished plastics in the United States.

Erie Works receives the Navy "E": first awarded to a G-E plant.

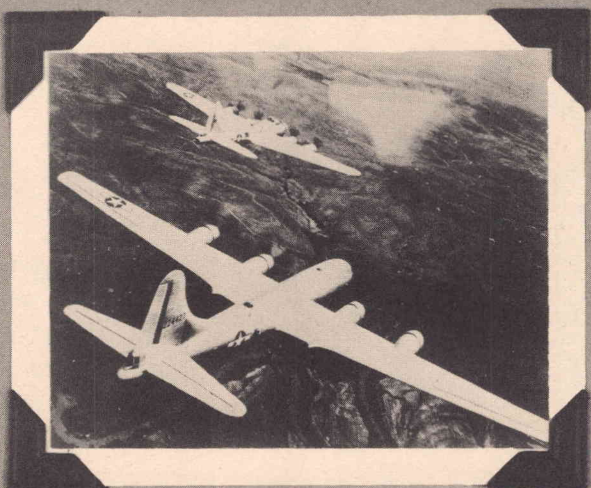
The new battleship, *North Carolina*, the largest U. S. warship, is launched; equipped with G-E propulsion, she is expected to develop 115,000 horsepower and have a speed of more than 27 knots.



G-E Electronics people are turning out radar and radio for victory.



Steel is essential to victory. These G-E motors will help produce it.



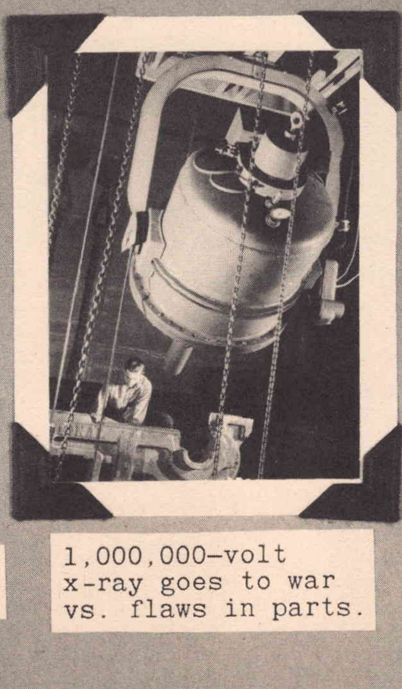
Gun systems designed & built by G.E. make B-29 a deadly adversary!



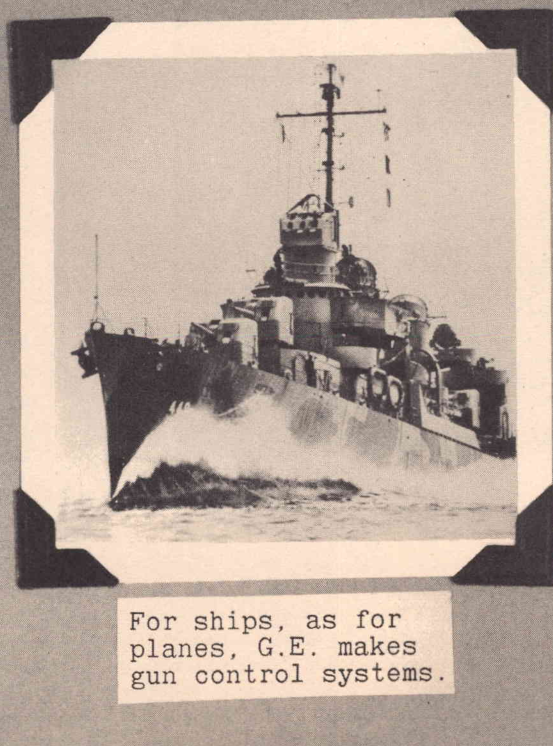
P-61 Black Widow also has G-E armament.



Bazookas, by the thousands, also come off lines at G.E.



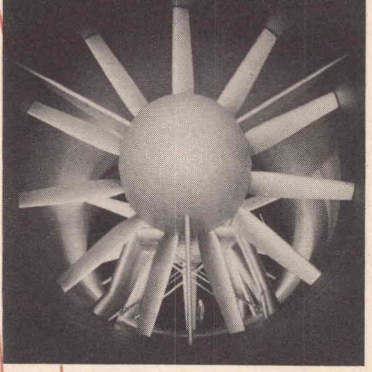
1,000,000-volt x-ray goes to war vs. flaws in parts.



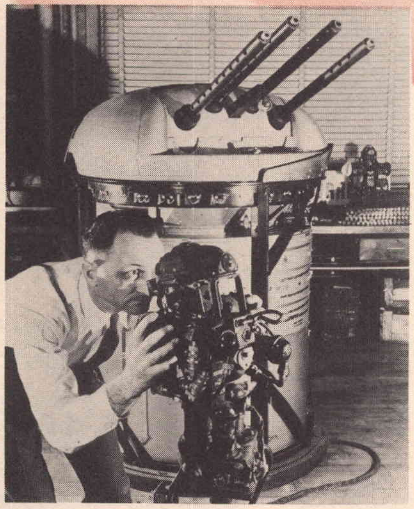
For ships, as for planes, G.E. makes gun control systems.



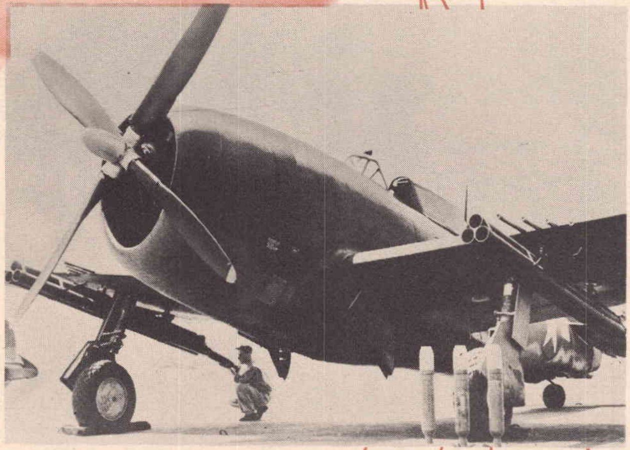
October 1, 1942—Two G-E jet engines power a Bell Airacomet in first flight of a U. S. jet plane.



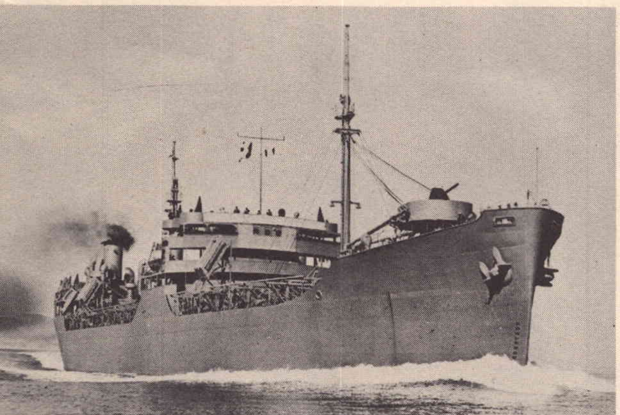
Still greater airplane speeds are sought through research in this 600-mph, G-E powered wind tunnel.



Electronic and mechanical units of this G-E gunfire control system aim and fire guns at enemy plane.



All six barrels of this plane's G-E paper plastic rocket launchers may be fired at once, or one by one.



High-speed tankers feed the fleet, often within sound of battle. G.E. built ¾ of turbine drives for Maritime Commission tankers.



In 1942, Board chairman Philip D. Reed resigned to serve as deputy chief of Harriman Commission.



Between September 18, 1942, and September 8, 1944, President Wilson served his country as vice Chairman of the WPB.

1942—Charles E. Wilson resigns to become member of War Production Board; Gerard Swope returns as President.

Philip D. Reed resigns to serve as deputy chief of the Harriman Mission in London; Owen D. Young returns as Chairman.

1943—Jet Propulsion for aircraft is announced. General Electric builds radar for locating planes and ships.

Twenty thousand kilowatts of electric generating capacity in the form of two mobile railway-car power plants are built in Schenectady.

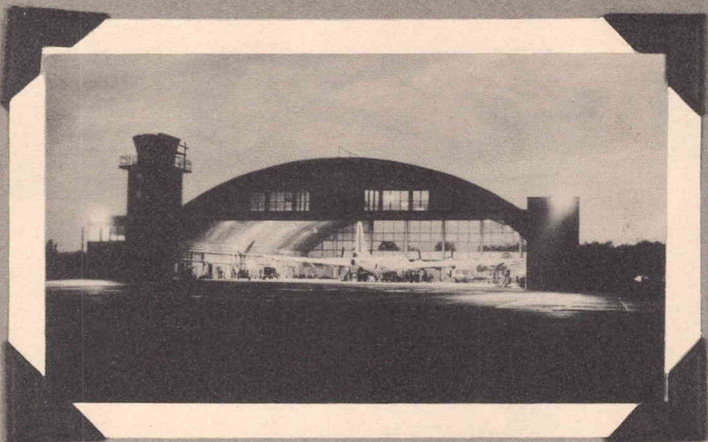
The new General Electric Credit Corporation is announced.

1944—The Erie Works wins its 9th award in June, continuing its record of winning every wartime production award given by U. S. military forces.

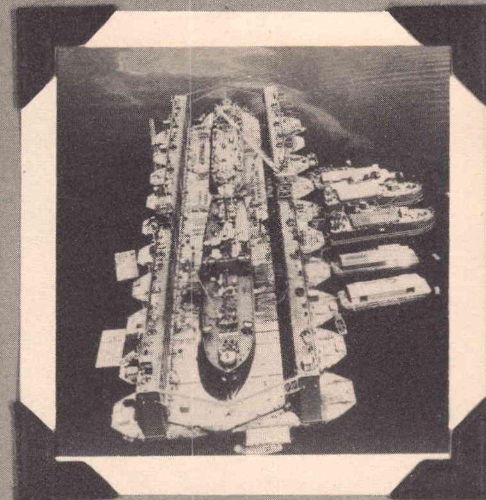
Launching of the USS *Missouri* in January is telecast. G.E. produced her geared-turbine propulsion units and a large variety of other operating and ordnance equipment aboard.

Schenectady Works Laboratory celebrates its 50th year.

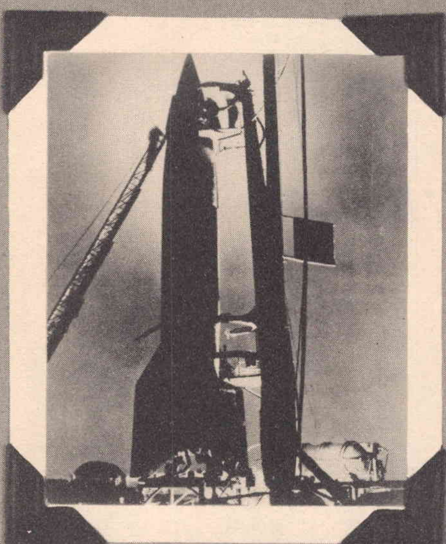
Charles E. Wilson is again elected president.



Planes are put through their paces at G-E Flight Test Lab.



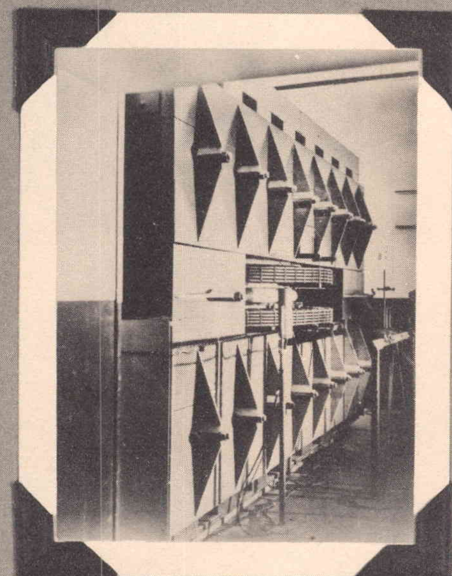
Electrified floating drydock in battle area.



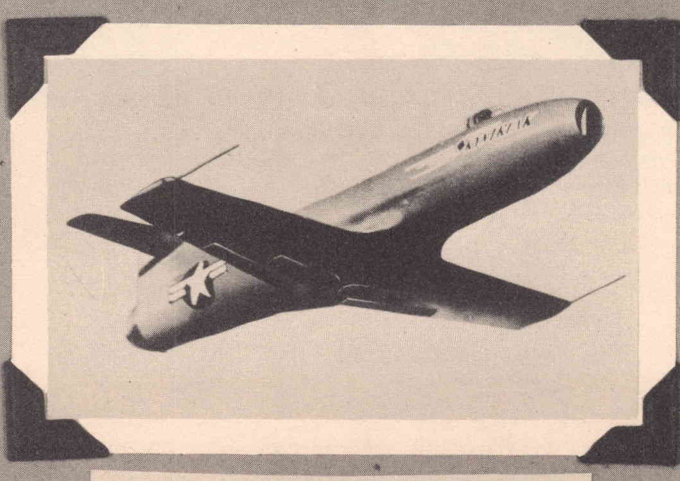
G-E scientists fire V-2's for Gov't in N.M.



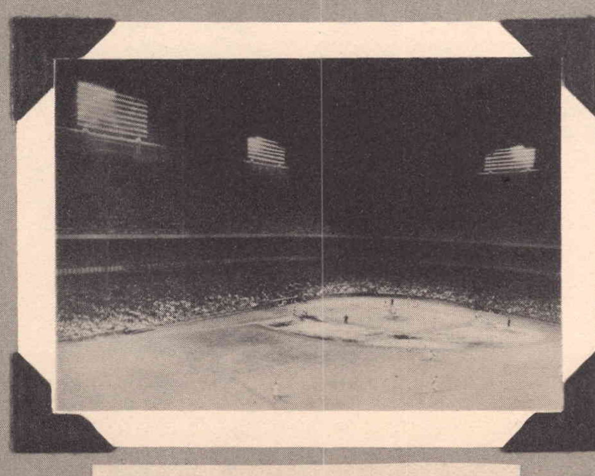
1946 - Dr. V. J. Schaefer made "artificial" snow.



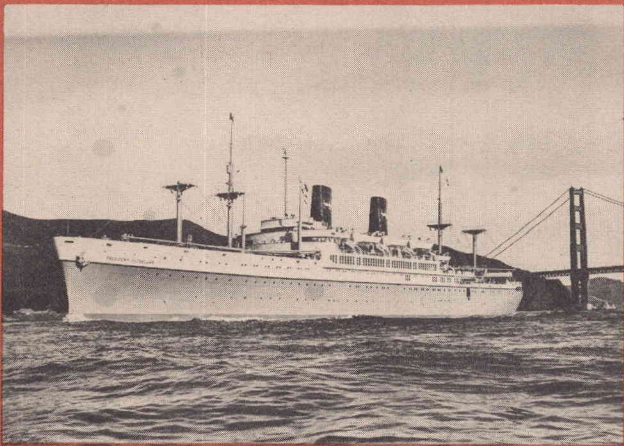
1945 - G-E betatron produces x-rays of 100,000,000 volts.



Douglas Skystreak is designed to fly into transonic range — between 600 and 750 m.p.h.



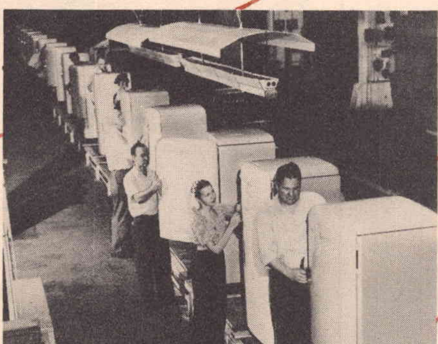
Yankee Stadium's 1200 G-E floodlights spread light evenly over $3\frac{1}{4}$ acres.



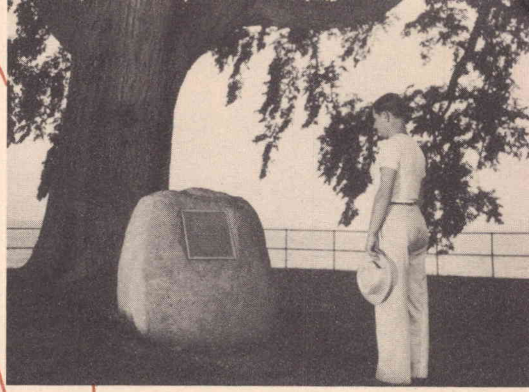
The 23,500-ton President Cleveland was launched in 1947. Its G-E turbine generators help drive ship at 19 knots.



In August, 1947, the Douglas *Skystreak* set a record of 650.6 mph. In late 1952, the G-E powered F86D, shown above, set a new record. It was clocked at 698.5 mph!



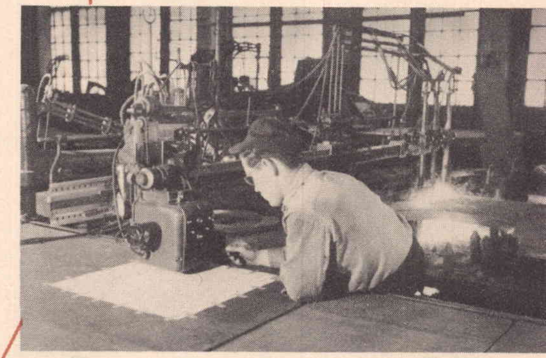
Shortly before V-J Day, refrigerators went back into production. They were modified 1942 models.



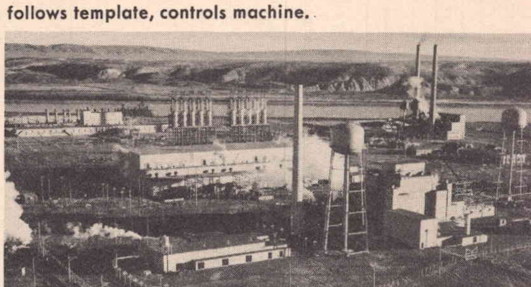
As typically "GE" as the Company's monogram is the *Island,* where summer management meetings are held.



In 1946, the G-E Half-Century Club boasted 100 members. The granddaddy of club had 57 years of service.



1945—A tool with a sense of touch is this contour follower. It follows template, controls machine.



In 1947, G.E. began operation of atomic works at Hanford, Washington.

1945—Crowning technological development is the atomic bomb, development and production of which, American industry, including General Electric, co-operated in unprecedented manner.

Philip D. Reed is again selected Chairman of the Board.

New Chemical Department gets under way; headquarters, Pittsfield.

G.E. announces the 100,000,000-volt electron accelerator.

G.E. demonstrates electronic navigator for commercial vessels.

1946—Research program begun on power generation by atomic energy, and operation is begun of Government's Hanford Works.

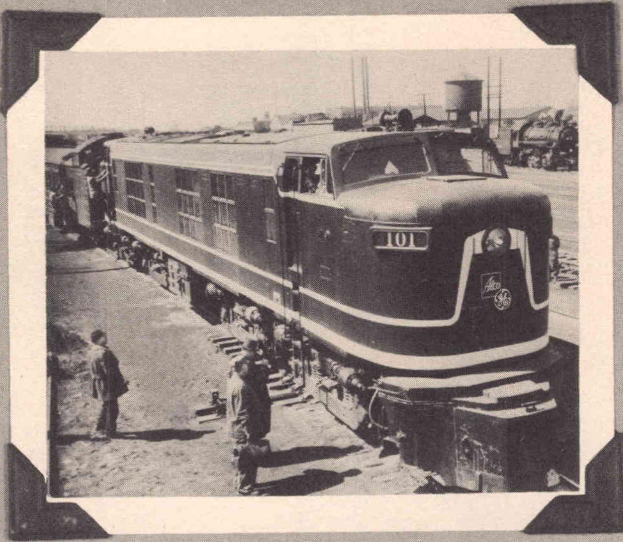
Flight Test Center is formally opened at Schenectady.

Lighting Institute at Nela Park is improved and rededicated.

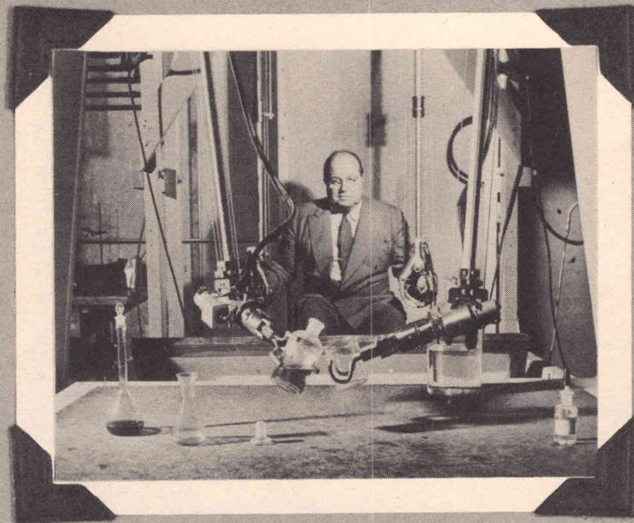
"Snow-making" is announced by Irving Langmuir and V. J. Schaefer.

1947—Work is started on Knolls Atomic Power Laboratory.

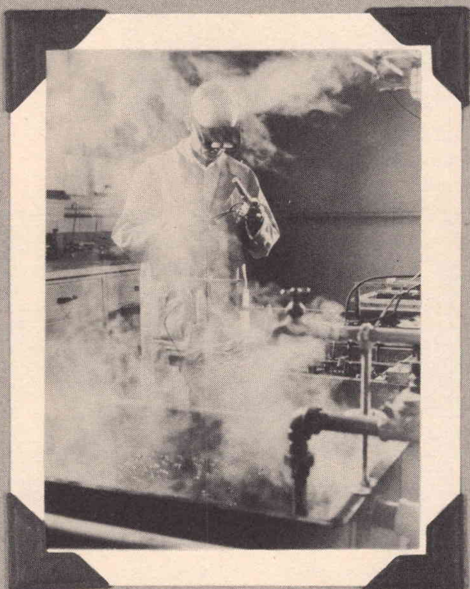
Douglas *Skystreak*, with General Electric jet engine, sets new world speed record of 650.6 miles per hour.



1949 - America's first gas-turbine locomotive.



These hands for atomic research are almost human.



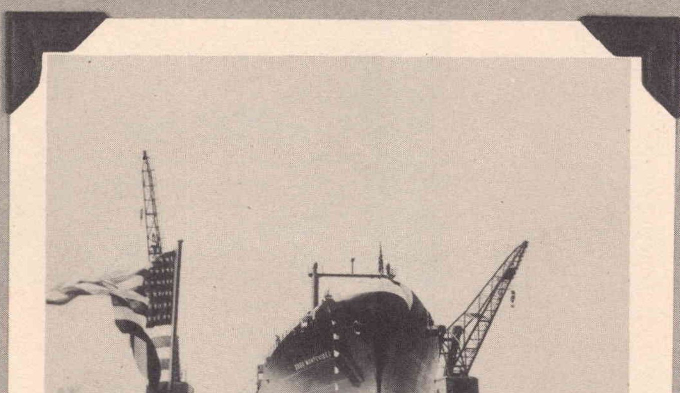
In new measurements lab at Lynn, Mass.



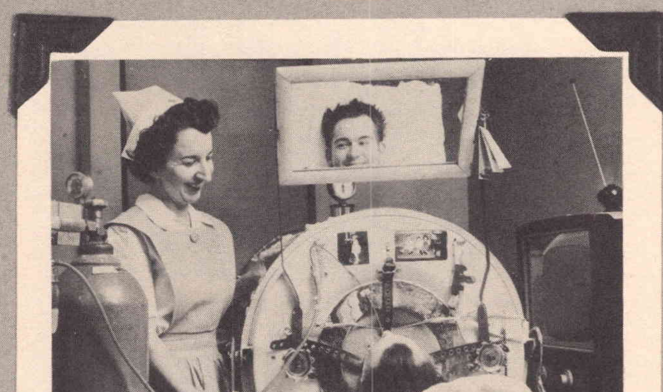
Trolley coach powered by G.E. in San Francisco.



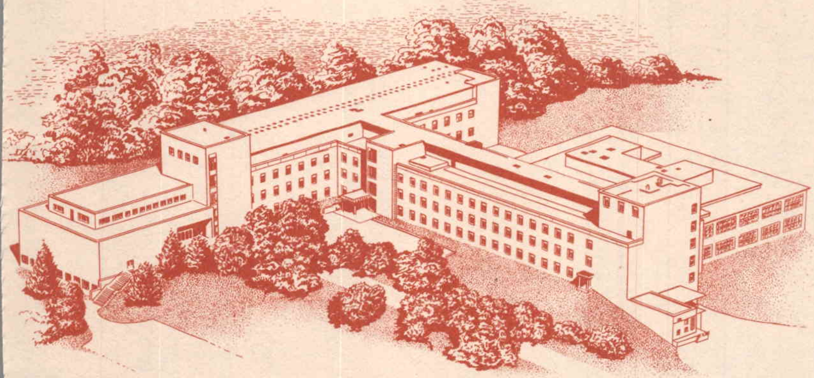
Turn off radio, answer phone - Remote Control.



One of Esso's 14 new supertankers - Propulsion units by General Electric.



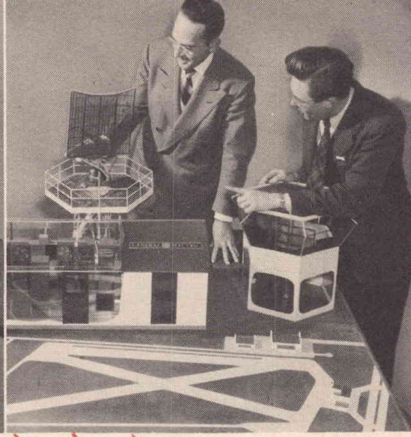
This G-E girl works after hours as a hospital aide - "just for fun."



On its 50th anniversary, the Research Laboratory, nation's first in industry, dedicated new quarters just outside Schenectady, New York.

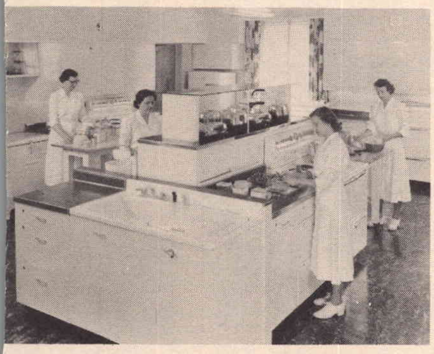


1950—Upon C. E. Wilson's retirement, Ralph J. Cordiner became President of General Electric.



Airport radar system, new in 1950, accurately positions all aircraft within 30-mile range.

At G-E Consumers Institute in Bridgeport, Conn., appliances are put through their paces.



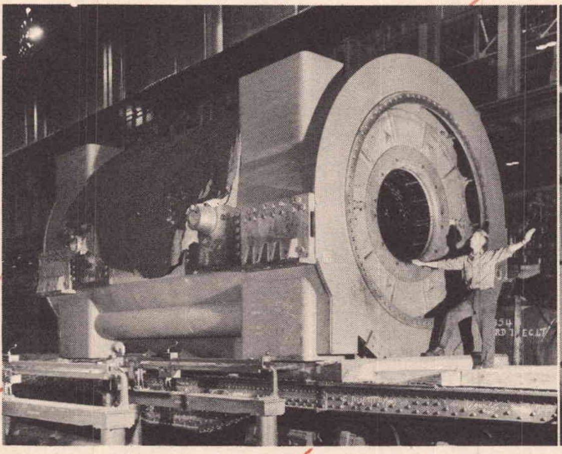


1949 — G.E. announced a new heating method which blankets cold outer walls with warm air.

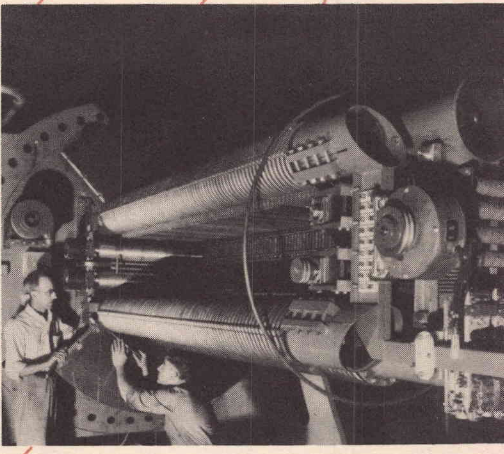


Meter with a magnet. New in 1948, this I-50 watthour meter is practically frictionless.

176-ton turbine generator stator was first piece to come from new turbine building in 1949.



4,000,000-volt electrostatic accelerator, built by G.E. for Brookhaven laboratories in 1948.



1948—General Electric X-Ray Corp. (now Dept.) opens world's largest x-ray developmental laboratory and names it after Dr. W. D. Coolidge.

1949—A new High Voltage Laboratory is opened at Pittsfield.

Union Pacific begins tests of 4500-hp gas-turbine locomotive.

G.E. opens a new jet engine plant near Cincinnati, Ohio.

Schenectady's 20-acre Turbine Building is in full operation.

Air-wall heating receives immediate acceptance, and 10 pilot installations are made of the heat pump.

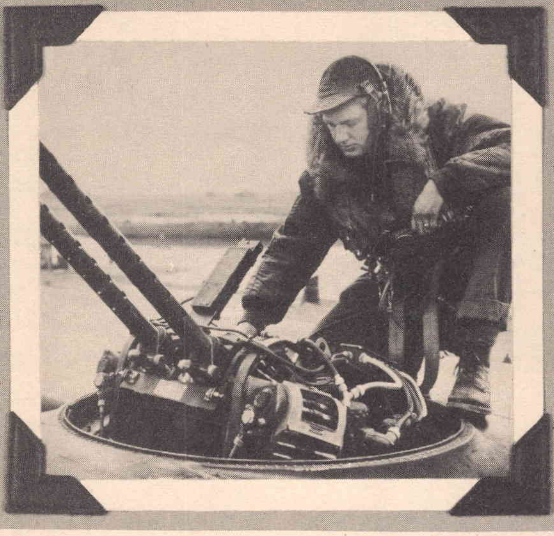
Ralph J. Cordiner becomes Executive Vice President.

1950—Research Laboratory dedicates new buildings on 50th anniversary.

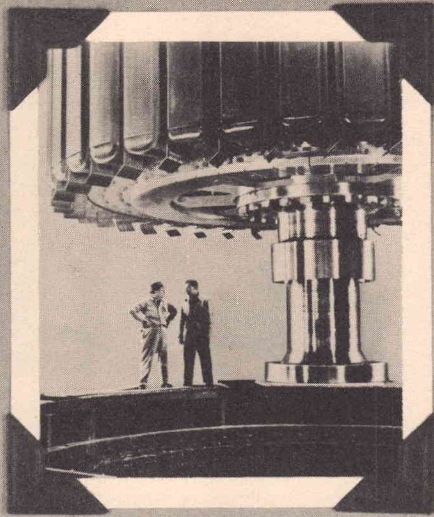
Other research facilities completed during the year are those of the Knolls Atomic Power Laboratory, at Schenectady, and the Measurements and Aircraft Gas Turbine laboratories, at Lynn.

Gas turbine engines for rail and power plant applications go into volume production for the first time.

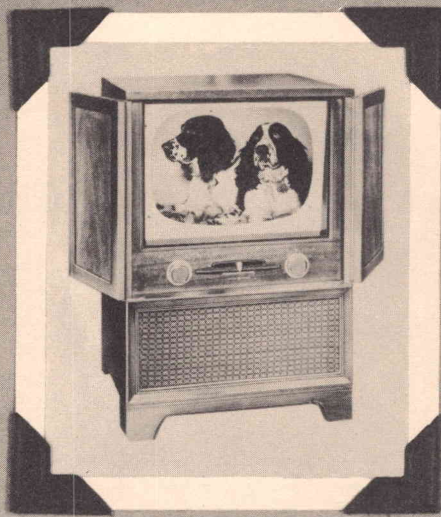
Charles E. Wilson retires. Ralph J. Cordiner becomes President.



Korea - G-E gun turrets once more sweep the skies of enemy planes.



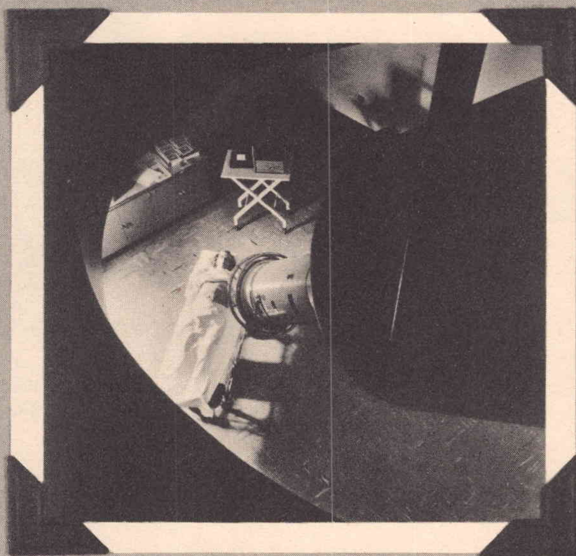
G-E generator rotor, Leppiniemi, Finland.



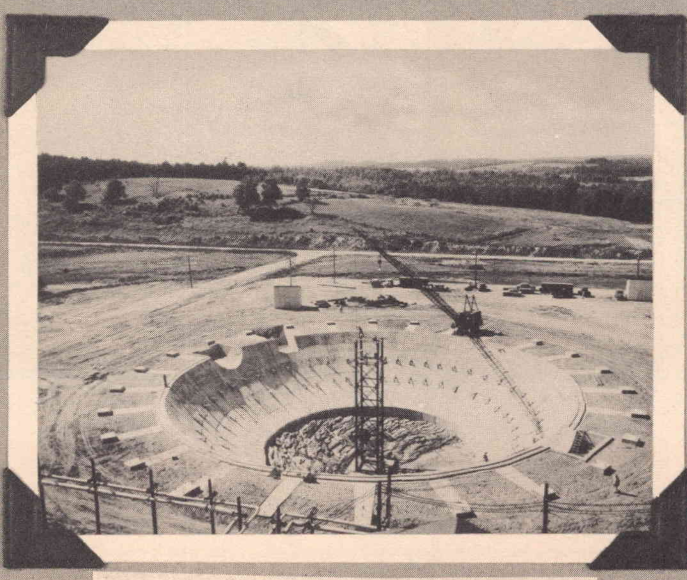
Bigger all the time! Now a 21-inch TV set.



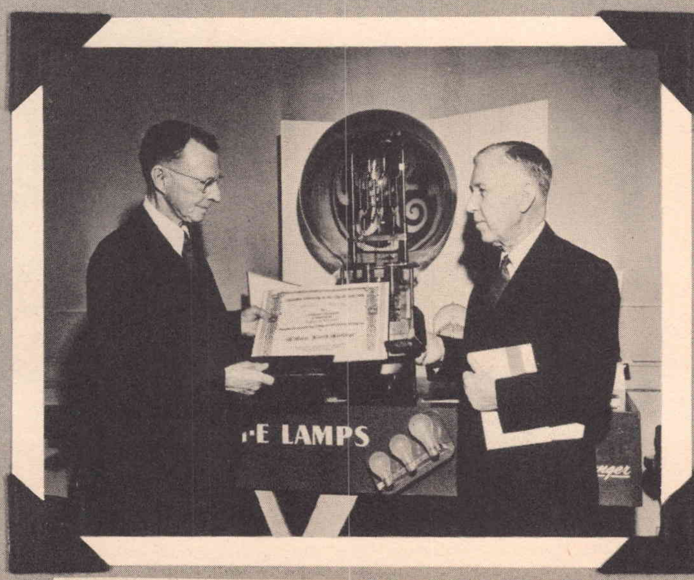
Giant cargo helicopter is powered by G-E jet engines.



Man gains in cancer fight. Powerful x-rays are a boon.



225-foot sphere in this saucer will house atomic sub reactor.



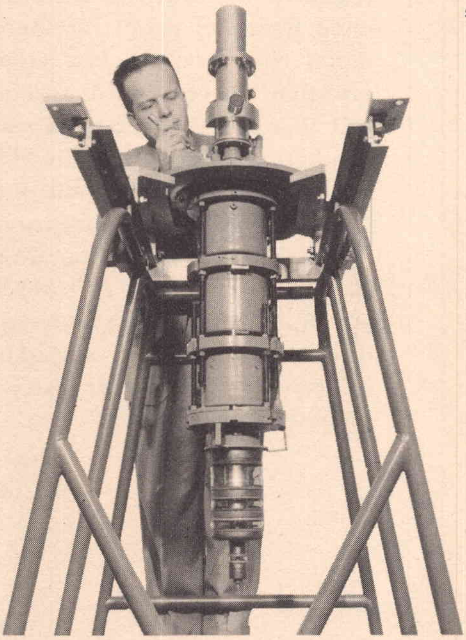
Scientist W. D. Coolidge receives K. C. Li award for tungsten research.

SALES TOTALS: 1901-1952

1901	$27,969,000
1911	69,851,000
1921	179,722,000
1931	252,021,000
1941	1,132,837,000
1951	2,319,348,000
1952	2,623,888,000



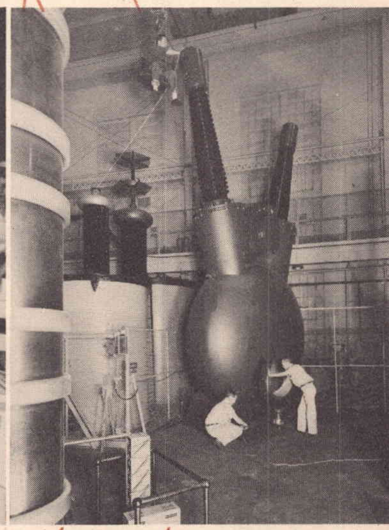
Many G-E people take advantage of after-work and spare weekend hours to work with hometown youngsters.



This 200-pound electronic giant, a klystron tube, is a power tube developed by G.E. for UHF television.



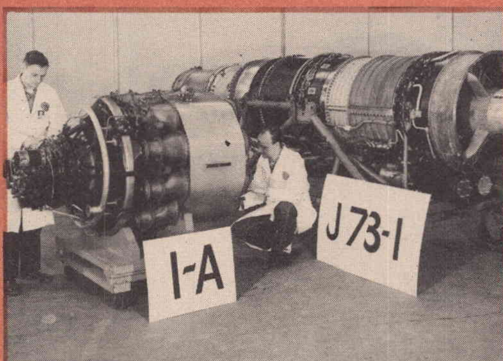
Each year in April, G-E shareowners come to Schenectady to meet. Box lunches are the order of the day.



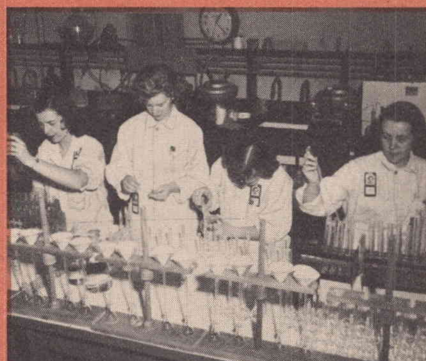
Ready for test at Philadelphia is one of 15 G-E oil circuit breakers for 330,000-volt power network.



Atop New York's Empire State Building is a new G-E aircraft warning light, designed for long life.



These two G-E jet engines represent the span of 10 years. The I-A was America's first jet engine; the new J-73-1 is far more powerful.



To assure safety for its atomic workers, G.E. keeps constant check on plant and animal health near works.

1951—Mobilization for defense keynotes research and engineering.

New weapons against cancer: 70,000,000-volt synchrotron and cancer-treating machine utilizing high-energy radiation of Cobalt 60.

Two 65,000-hp synchronous motors—world's largest—are installed at pumping plant at Grand Coulee Dam.

Turbosuperchargers accumulate more than one million hours of commercial line service on Boeing *Stratocruisers*.

Construction starts on Appliance Park near Louisville, Ky.

1952—On the 10th anniversary of jet flight in America, G.E. becomes the nation's largest producer of aircraft jet engines.

Work commences, near Schenectady, on a steel sphere which will house prototype submarine nuclear reactors being built by G.E. for AEC.

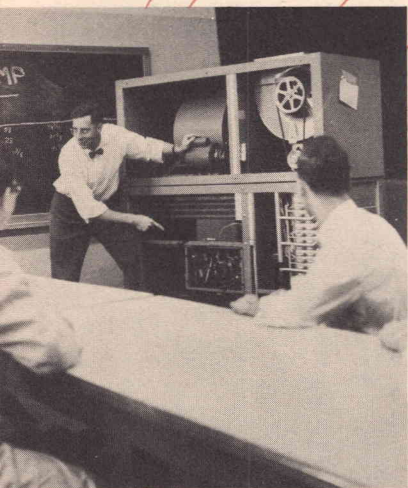
New G-E alloy, *Cond-al,* permits 35% increase in size and output of new turbine generators.

G.E. markets *Monotop,* one-piece molded plastics kitchen counter.

New G-E Form G motor provides usual power, weighs 50% less.



A milestone was passed in the 41st year of General Electric's Pension Plan when President Cordiner presented Henry Hochuli with his 249th monthly pension check. Included in the check was G.E.'s 100,000,000th pension dollar.



Some day, millions of American homeowners will use a single machine, the heat pump, to heat their houses in winter, cool them in summer—all without burning an ounce of fuel. Put on the market in 1952, but still undergoing development which will further its efficiency and lower its cost, the G-E heat pump extracts heat from the outside air, pumps it indoors in a refrigerant, and disperses it. In summer, it reverses itself, taking the heat outdoors.

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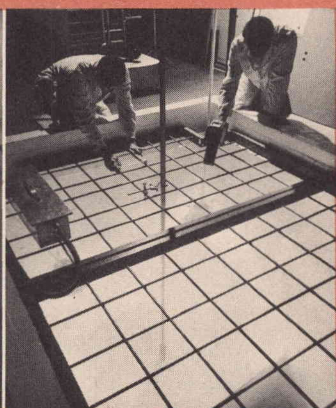
In the seven post-World War II years, a total of $650,000,000 has been invested in plant modernization and expansion, and projected expenditures in the next three years will bring this to a total of more than one billion dollars. To understand fully why this course has been advisable, it is necessary to keep in mind what lies ahead for the electrical industry. Based on the best estimates of the growth of the economy as a whole, it is probable that in the next ten years as much electrical generating equipment will be built, sold and installed as has been built and installed in the industry's past 75-year history.

Today the electrical manufacturing industry supplies 4 per cent of the Gross National Product. By 1961 it will supply an estimated 5.5 to 6 per cent. In fact, the electrical industry must be prepared to grow more than twice as fast as the rest of the economy.

Ralph J. Cordiner
President



G-E production people are not the only ones looking to the future. Recently evolved is a drafting technique which simplifies blueprints, cuts work 20 to 50 per cent.



Working hopefully toward peaceful use of atomic energy, G-E nuclear physicists here check radioactive cobalt, stored in water tank. Such cobalt is already fighting cancer.



Still a dream of the future is the G-E XR-10 refrigerator. Of 10-cubic-foot size, it occupies about half the space of today's refrigerator of equivalent capacity. As its insulation will be 10 times as efficient, its walls will be only ½-inch thick, as compared with the three inches necessary today. It will open from both front and back, serving kitchen and dining room, will dispense any size ice cube—and will even deliver the ice crushed, if desired.



The gas turbine is the newest of prime-movers. Its development in America has been spearheaded by G.E. Since its first installation in a locomotive in late 1948, it has found new and important applications in power generation and natural gas pipeline pumping.

These, some of the highlights of seventy-five years, are part of a continuing story of progress. The link between the closing pages of this pictorial history and our future progress can be well expressed in the words of Dr. Willis R. Whitney, first director of General Electric research:

• • •

"The undiscovered truths of creation are, I believe, much more numerous and of greater import than the ones thus far discovered."

You can put your confidence in—

GENERAL ELECTRIC

APF-73
6-53 (400M)